KD11-Z

11/44 CPU/EIS

CKKAAA0

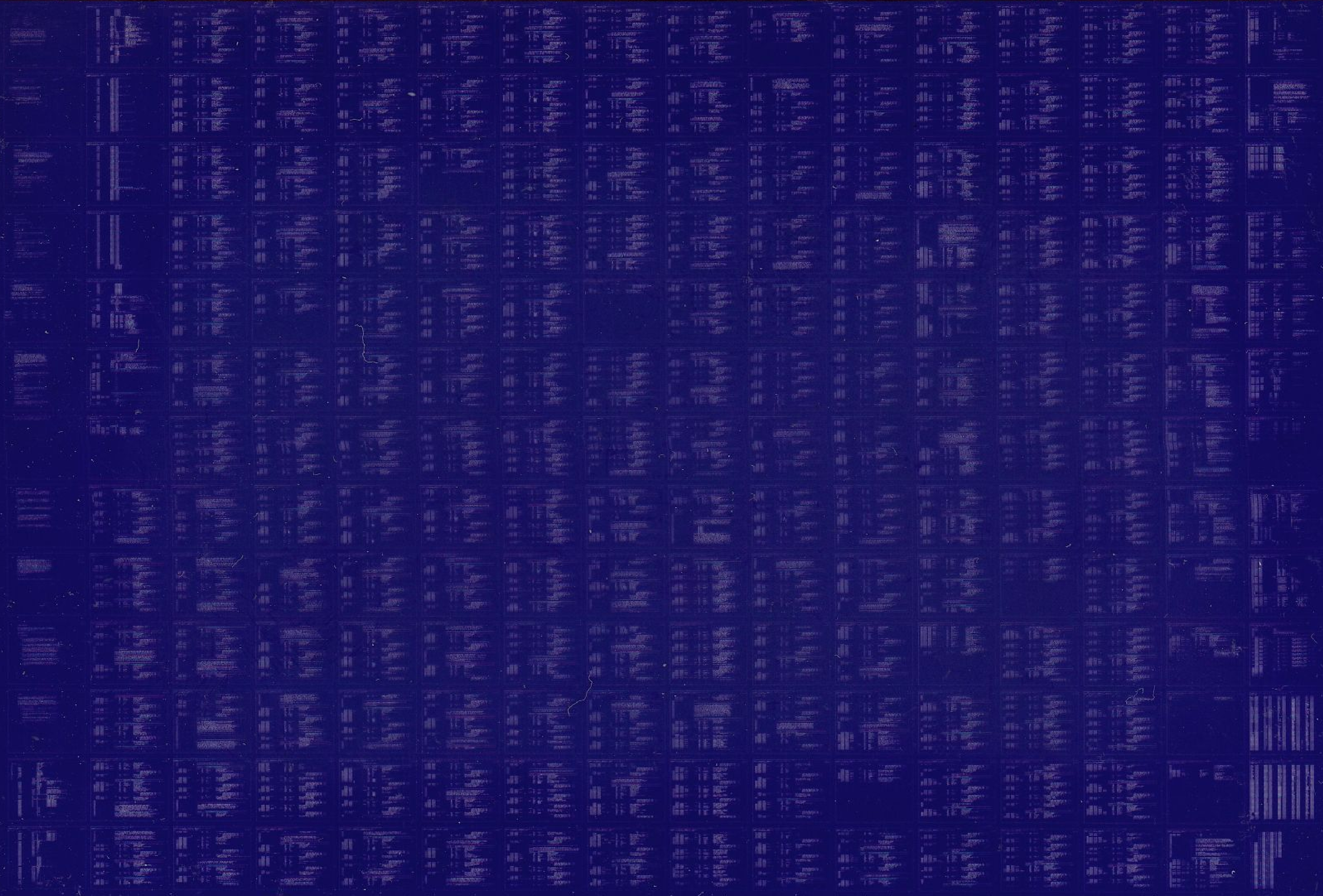
AH-F620A-MC

FICHE 1 OF 2

JAN 1980

digital

MADE IN USA



KD11-Z

11/44 CPU/EIS

CKKAAA0

AH-F620A-MC

FICHE 2 OF 2

JAN 1980

digital

MADE IN USA

IDENTIFICATION

Product Code:	AC-F618A-MC
Product Name:	CKKAAA0 11/44 CPU/EIS
Date Created:	MARCH 1979
Maintainer:	Diagnostic Group
Author:	CHUCK ROBINSON

The information in this software is subject to change without notice and should not be construed as a commitment by Digital Equipment Corporation.

DEC assumes no responsibility for the use or reliability of its software on equipment which is not supplied by DEC.

```
**************************************
*                                    *
* SUMMARY OF OPERATING INSTRUCTIONS *
*                                    *
**************************************
```

The following procedure can be used to run this diagnostic in a standard configuration with at least 8K of memory and a teletype. If the program does not run successfully consult the following document for assistance.

Operating Procedures:

1. Load the program using normal procedures

2. Start the program at Location 200

3. Program should print 'END OF PASS'' within the 1st second and repeatably thereafter at approx. 5 sec. intervals WITH CACHE ON. (APPROX. 10 SEC INTERVALS WITH CACHE OFF)

4. If the program does not run as described above, consult the full operating instructions which follow.

1.0 GENERAL PROGRAM INFORMATION

1.1 PROGRAM PURPOSE

This diagnostic program is designed to be a comprehensive check of the PDP-11/44 Basic Instruction Set. The program exercises all of the processor logic and microcode for all instructions except the Trap and Memory Management Instructions. The program does not test instructions or hardware related to the Trap or Interrupt mechanisms of the 11/44 (E.G. RTT, RT1, WAIT, RESET, TRAP, EMT).

NOTE: HOWEVER,IF THE OPTIONAL CPU/CIS TESTS ARE RUN THEN THE BREAKPOINT TRAP INSTRUCTION AND THE ABILITY TO TRAP UNDER ILLEGAL INSTRUCTION(TRAP TO 10) WILL BE ASSUMED TO BE FUNCTIONAL.(SEE SECT.2.3)

1.2 SYSTEM REQUIREMENTS

1.2.1 HARDWARE

PDP-11/44 Processor
16K Memory -- The program uses Locations 0 - 36000

1.2.2 SOFTWARE

This program is written to be run as a Stand-Alone program. However, the program is designed to run under Automated Product Test System (APT) in all three modes.

The program can also be run under the ACT 11 Monitor

1.3 RELATED DOCUMENTS AND STANDARDS

PDP-11/44 MICROCODE LISTING

PDP-11/44 ELECTRICAL SCHEMATICS

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

None

1.5 FAILURE ASSUMPTIONS

None

2.0 OPERATING INSTRUCTIONS

2.1 Loading And Starting Procedures

2.1.1 LOADING

Use normal procedures for Loading Absolute Binary Tapes.

2.1.2 NORMAL START

This is the procedure for normal program running (I.E., starting with Test 1 and executing entire diagnostic).

START AT ADDRESS = 200

2.1.3 SUBTEST START

This is the procedure for starting at a Subtest other than 1.

1. LOAD $TESTN (in Mailbox Section) with the number of Subtest minus one (in Octal). For example, to start at Subtest 100, $TESTN=77.
2. Load Starting Address of Subtest in Loc. 216
3. START AT ADDRESS = 204

2.2 SPECIAL ENVIRONMENTS

This program is written to comply with all the requirements of the APT Interface Specification. It will run under APT in either Quick Verify, program or Run-Time modes.

This program is written to comply with all of the requirements of programs to run under the ACT11 Monitor.

2.2.1 RUNNING UNDER APT

THE EXECUTION TIMES PROVIDED IN THE APT SCRIPT THAT FOLLOWS ARE FOR EXECUTION WITH A 11/44 PROCESSOR, CACHE, 16K CORE MEMORY, AND 300 BAUD.

THE FOLLOWING IS A PROGRAM LOAD FILE USED BY APT:

1. E TABLE 'A' IS USED FOR APT DUMP MODE.
   A. IN ADDITION TO NORMAL CPU DIAGNOSTIC TESTS THIS TABLE WILL SELECT THE OPTIONAL CACHE AND CIS TESTS.($SWREG=400)

2. E TABLE 'B' IS USED FOR APT QV MODE WHILE RUNNING ON A MANUFACTURING QV STATION.
   IT ACCOMPLISHES WHAT ETABLE 'A' DOES BUT ADDITIONALLY SUPRESSES TYPEOUTS.($ENVM=240)

3. ETABLE 'C' IS USED FOR APT QV OR RUNTIME MODES WHILE RUNNING ON SYSTEMS OTHER THAN MFG. QV STATIONS. THIS TABLE DESELECTS THE OPTIONAL CACHE AND CIS TESTS.

1ST PASS RUN TIME	LONGEST TEST TIME	ADDITIONAL RUN TIME
10	10	0

...... E TABLES ....

	A	B	C
E-MODE/S-MODE ($ENVM/$ENV)	200/000	240/001	240/001
SWITCH REGISTER 1 ($SWREG)	000400	000400	000000
SWITCH REGISTER 2	000000	000000	000000
CPU TYPE/OPTIONS	00/0000	00/0000	00/0000

2.3 PROGRAM OPTIONS

This program is intended to be a Basic Processor Test. It is intended to be the lowest level diagnostic run. HOWEVER, IT DOES PROVIDE FOR OPTIONAL CACHE AND CIS TESTS. THESE TESTS CAN BE SELECTED AND RUN IN MANUFACTURING ON THE MFG. QV STATTION. THE TESTS ARE SPECIALLY DESIGNED TO EXERCISE THOSE SIGNALS ON THE CPU DATA PATH/CONTROL MODULES WHICH RELATE TO THE CACHE AND CIS. IT IS ASSUMED THAT CACHE AND CIS MODULES ARE KNOWN GOOD. RUNNING THESETESTS ELIMINATE HAVING TO RUN THE CACHE AND CIS DIAGNOSTICS IN THE CPU APT QUICK VERIFY SCRIPT.

THE OPTIONAL TESTS ARE SELECTED THROUGH APT SCRIPTING OR BY LOADING BIT08 OF HARDWARE SWITCH REGISTER(177570). SEE SECTION 2.2.1.

2.4 EXECUTION TIMES

The diagnostic completes the first pass in less than 1 sec. Subsequent PRINTING OF END OF PASS MESSAGE REQUIRE APPROXIMATELY. 5 TO 10 SECS. INTERVALS
The program will run continuously until externally Halted.

3.0 ERROR INFORMATION

3.1 ERROR TYPES

There are two basic types of Errors in the diagnostic.

3.1.1 FUNCTIONAL ERRORS

These are Errors which represent a malfunction of an Instruction or Sequence of Instruction. (E.G., the proper condition code not set or improper result of an Arithmetic or Logical Operation).

3.1.2 SEQUENCE ERRORS

The result of a Test being executed out of Sequence. (E.G. Wild Machine or improper Branch or Jump).

3.2 ERROR REPORTING PROCEDURES

The diagnostic responds to the detection of all Errors by storing certain information in Memory and Halting the Processor. The information stored in Memory can be used by the operator to identify the Error detected.

Certain failures will cause the Processor to Hang.

```
This type of failure is indicated if the program
does not print its END OF PASS indication within a reasonable
amount of time. (First message should appear within 1 sec.)
```

3.3 ERROR DESCRIPTOR INFORMATION

The diagnostic Mailbox holds the Error information necessary to identify the detected Error. This information has been designed for compliance with the APT diagnostic interface specification. It is the primary medium for identifying Errors.

3.3.1 $MSGTYP

This Location is incremented from zero to one before the program comes to a programmed Halt. If this Location is not one, then the diagnostic has come to an unprogrammed Halt. Check the Stack and PC for a clue to the cause. Suspect a Trap.

3.3.2 $FATAL

This Location is Loaded with a number before a Halt is executed. Each programmed Halt has a unique number associated with it which can be used to identify the Error which has been detected.

3.3.3 $PASS

This Location is incremented for every complete pass of the diagnostic. Monitoring the Location will indicate whether or not the program is Hung. It will also indicate the number of successful passes completed before the Error Halt. A high pass count might indicate that the Error Halt is associated with an intermittant fault.

3.3.4 $TESTN

This Location is incremented in each new Subtest. This should indicate the Test being executed when the Error was detected. This Location is also used to detect a Sequence Error.

3.4 ERROR IDENTIFICATION

Because of the overhead associated with each Halt in an APT compatible program the sequence check code will share the Error Halt of Functional Error within each Subtest. To determine which Error is being reported, Locations $FATAL and $TESTN are used together. When an Error Halt occurs, check $FATAL to determine the number of the Error detected. Now, check that the test number where this Error is detected corresponds to the value in $TESTN. If these agree the Error was a Functional Error as described in the Listings. If these numbers do not agree, then a Sequence Error was detected. In this case $TESTN will contain one more than the number of the last Test successfully completed. Sequence Errors which share the Error Halts of Functional Errors will always be reported by the last Halt in Subtest in which they were discovered.

4.0 PROGRESS REPORT

The message CKKAAA0 11/44 CPU/EIS is printed on the console Teletype after the first PASS, and following every subsequent 400 PASSES.

5.0 TROUBLE SHOOTING

When the program discovers a Fault it will Halt. to determine the cause of the Halt, the diagnostic provides Error information. This information is stored in the APi mailbox and is the primary source of Error identification.

Upon finding an Error, the following procedure should aid in isolating the fault.

5.1 CHECK THE MAILBOX

1. $MSGTY This Location should contain a 1. if the Processor Halts and this Location is zero, then the processor has come to an unexpected Halt. First suspect a Trap. Check the PC and if a Trap check R6 and the stack for the Location of the failing instruction.

2. $FATAL This location is used to hold the number of the error which has detected. Each Error being checked by the diagnostic is assigned a unique number which is stored in $FATAL when that Error is detected.

   When an Error is detected, check the listing to see that the Error number stored in $FATAL is one which is detected in the test whose number is in $TESTN. If there is a disagreement then the Error being reported is a Sequence Error. $TESTN contains one more than the last test which was successfully completed.

3. $TESTN This Location is used to indicate the number of the test which was being executed when the fault was detected. $TESTN is used in conjunction with $FATAL to distinguish between Sequence and Functional Errors. (See 2. this Section)

4. $PASS This Location is used to indicate the number of successful passes which the diagnostic has completed. This will give an indication that the diagnostic has not just been Hung in a Loop

   If an Error has been detected $PASS will show whether it was a Hard Error discovered during the first try or whether it was intermittant or developed during the running of the diagnostic.

5.2 SCOPING

While this diagnostic is primarily intended to be a fault detection program, provisions are made to assist a technician who might want to use the program as a trouble shooting test.

The procedure for scoping a Subtest involves modifying several Memory Locations in the test itself. The philosophy is to provide a Scoping Loop which will include the code where the Error was detected. The Loop is set up so that the Loop will not be terminated should the Error intermittantly disappear.

The procedure is a follows:

1. Determind which Error is to be Scoped. Use $FATAL and $TESTN for this (See above)

2. Locate the Error routine in the listing.

3. Clear the right Byte of the Conditional Branch Instruction associated witih the Error. (This is marked with <===='s in the listing.)

4. Replace the Instruction following <MOV #XXX,-(R2)) with the Scoping Branch provided in the listing comments.

5. Restart the program. The program may be restarted from the beginning or from the Subtest (See 2.0).

6.0 LISTING

```
                            .TITLE CKKAAA0 11/44 CPU/EIS
000000                      .ENABLE ABS
         001000             STBOT=1000
                            .NLIST  CND,MC,MD
                            .LIST   ME
         000240             SCOPE=NOP
         000007             R7=%7
         000006             R6=%6
         177776             PS=177776
         177564             TPS=177564
         177566             TPB=177566
         140000             USRM=140000
         030000             PUSRM=30000
         177772             PIRQ=177772
         000020             BIT4=20
         000007             MFPT=7
                   .MCALL   .$APTHDR,.$APTBLS,.$ACT11
                   .MCALL   .$CATCH,.1170
                   .SBTTL   BASIC DEFINITIONS
                   ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
         001100    STACK=   1100              ;;FIRST ADDRESS OF THE STACK
         001100    KERSTK=  STACK             ;;KERNEL STACK
         000700    SUPSTK=  STACK-200         ;;SUPERVISOR STACK
         000600    USESTK=  STACK-300         ;;USER STACK
         104000             ERROR=EMT
         000004             SCOPE=IOT
         177776    PS=      177776            ;;PROCESSOR STATUS WORD
         177776             PSW=PS
         177774    STKLMT=  177774            ;;STACK LIMIT REGISTER
         177772    PIRQ=    177772            ;;PROGRAM INTERRUPT REQUEST REGISTER
         177570    DSWR=    177570            ;;HARDWARE SWITCH REGISTER
         177570    DDISP=   177570            ;;HARDWARE DISPLAY REGISTER
         177546    LKS=     177546            ;;LINE CLOCK (KW11-L) STATUS REGISTER
                   ;*MISCELLANEOUS DEFINITIONS
         000011    HT=      11                ;;CODE FOR HORIZONTAL TAB
         000012    LF=      12                ;;CODE LINE FEED
         000015    CR=      15                ;;CODE CARRIAGE RETURN
         000200    CRLF=    200               ;;CODE FOR CARRIAGE RETURN-LINE FEED
                   ;*GENERAL PURPOSE REGISTER DEFINITIONS
         000000    R0=      %0                ;;GENERAL REGISTER
         000001    R1=      %1                ;;GENERAL REGISTER
         000002    R2=      %2                ;;GENERAL REGISTER
         000003    R3=      %3                ;;GENERAL REGISTER
         000004    R4=      %4                ;;GENERAL REGISTER
         000005    R5=      %5                ;;GENERAL REGISTER
         000006    R6=      %6                ;;GENERAL REGISTER
         000007    R7=      %7                ;;GENERAL REGISTER
         000000             R10=R0
         000001             R11=R1
         000002             R12=R2
         000003             R13=R3
         000004             R14=R4
         000005             R15=R5
         000006    SP=      %6                ;;STACK POINTER
         000006             KSP=SP
         000006             SSP=SP
         000006             USP=SP
```

```
        000007                  PC=     %7              ;;PROGRAM COUNTER
                                ;*PRIORITY LEVEL DEFINITIONS
        000000                  PR0=    0               ;;PRIORITY LEVEL 0
        000040                  PR1=    40              ;;PRIORITY LEVEL 1
        000100                  PR2=    100             ;;PRIORITY LEVEL 2
        000140                  PR3=    140             ;;PRIORITY LEVEL 3
        000200                  PR4=    200             ;;PRIORITY LEVEL 4
        000240                  PR5=    240             ;;PRIORITY LEVEL 5
        000300                  PR6=    300             ;;PRIORITY LEVEL 6
        000340                  PR7=    340             ;;PRIORITY LEVEL 7
                                ;*''SWITCH REGISTER'' SWITCH DEFINITIONS
        100000                  SW15=   100000
        040000                  SW14=   40000
        020000                  SW13=   20000
        010000                  SW12=   10000
        004000                  SW11=   4000
        002000                  SW10=   2000
        001000                  SW09=   1000
        000400                  SW08=   400
        000200                  SW07=   200
        000100                  SW06=   100
        000040                  SW05=   40
        000020                  SW04=   20
        000010                  SW03=   10
        000004                  SW02=   4
        000002                  SW01=   2
        000001                  SW00=   1
        001000                          SW9=SW09
        000400                          SW8=SW08
        000200                          SW7=SW07
        000100                          SW6=SW06
        000040                          SW5=SW05
        000020                          SW4=SW04
        000010                          SW3=SW03
        000004                          SW2=SW02
        000002                          SW1=SW01
        000001                          SW0=SW00
                                ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
        100000                  BIT15=  100000
        040000                  BIT14=  40000
        020000                  BIT13=  20000
        010000                  BIT12=  10000
        004000                  BIT11=  4000
        002000                  BIT10=  2000
        001000                  BIT09=  1000
        000400                  BIT08=  400
        000200                  BIT07=  200
        000100                  BIT06=  100
        000040                  BIT05=  40
        000020                  BIT04=  20
        000010                  BIT03=  10
        000004                  BIT02=  4
        000002                  BIT01=  2
        000001                  BIT00=  1
        001000                          BIT9=BIT09
        000400                          BIT8=BIT08
        000200                          BIT7=BIT07
        000100                          BIT6=BIT06
        000040                          BIT5=BIT05
        000020                          BIT4=BIT04
        000010                          BIT3=BIT03
        000004                          BIT2=BIT02
        000002                          BIT1=BIT01
        000001                          BIT0=BIT00
                                ;*BASIC "CPU" TRAP VECTOR ADDRESSES
        000004                  ERRVEC= 4                       ;;TIME OUT AND OTHER ERRORS
        000010                  RESVEC= 10                      ;;RESERVED AND ILLEGAL INSTRUCTIONS
        000014                  TBITVEC=14                      ;;"T" BIT
        000014                  TRTVEC= 14                      ;;TRACE TRAP
        000014                  BPTVEC= 14                      ;;BREAKPOINT TRAP (BPT)
        000020                  IOTVEC= 20                      ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
        000024                  PWRVEC= 24                      ;;POWER FAIL
        000030                  EMTVEC= 30                      ;;EMULATOR TRAP (EMT) **ERROR**
        000034                  TRAPVEC=34                      ;;"TRAP" TRAP
        000060                  TKVEC=  60                      ;;TTY KEYBOARD VECTOR
        000064                  TPVEC=  64                      ;;TTY PRINTER VECTOR
        000100                  LKVEC=  100                     ;;LINE CLOCK (KW11-L) VECTER
        000114                  CACHVEC=114                     ;;CACHE ERROR INTERRUPT VECTOR
        000240                  PIRQVEC=240                     ;;PROGRAM INTERRUPT REQUEST VECTOR
        000250                  MMVEC=  250                     ;;MEMORY MANAGEMENT VECTOR
                                .SBTTL  CACHE   REGISTER DEFINITIONS
        177740                  LOADRS = 177740                 ;;LOWER 16 BITS OF ADDRESS THAT CAUSED ERROR
        177742                  HIADRS = 177742                 ;;UPPER SIX BITS OF ADDRESS THAT CAUSED ERROR
        177744                  MEMERR = 177744                 ;;CACHE ERROR REGISTER
        177746                  CONTRL = 177746                 ;;MEMORY CONTROL REGISTER
        177750                  MAINT  = 177750                 ;;MEMORY MAINTENENCE REGISTER
        177752                  HITMIS = 177752                 ;;HIT MISS REGISTER "1" IMPLIES HIT IN CACHE
                                .SBTTL  CPU REGISTER DEFINITIONS
        177760                  SIZELO = 177760                 ;;MEMORY SIZE REGISTER NUMBER TO PUT INTO A PAR
                                                                ;;TO GET TO THE LAST 32 WORDS OF MEMORY
        177762                  SIZEHI = 177762                 ;;HIGH SIZE REGISTER, RESERVED FOR FUTURE USE
                                                                ;;CURRENTLY ALL ZERO
        177764                  SYSTID = 177764                 ;;SYSTEM ID REGISTER
        177766                  CPUERR = 177766                 ;;CPU ERROR REGISTER HOLDS CONDITION THAT CAUSED
                                                                ;;THE TRAP TO ERRVEC (000004)
                                .SBTTL  MEMORY MANAGEMENT DEFINITIONS
                                ;*MEMORY MANAGEMENT STATUS REGISTER ADDRESSES
        177572                  MMR0=   177572
        177574                  MMR1=   177574
        177576                  MMR2=   177576
        172516                  MMR3=   172516
        177572                          SR0=MMR0
        177574                          SR1=MMR1
        177576                          SR2=MMR2
        172516                          SR3=MMR3
                                ;*USER "I" PAGE DESCRIPTOR REGISTERS
        177600                  UIPDR0= 177600
        177602                  UIPDR1= 177602
        177604                  UIPDR2= 177604
        177606                  UIPDR3= 177606
        177610                  UIPDR4= 177610
        177612                  UIPDR5= 177612
        177614                  UIPDR6= 177614
        177616                  UIPDR7= 177616
```

```
                                        ;*USER ''D'' PAGE DESCRIPTOR REGISTORS
              177620                    UDPDR0= 177620
              177622                    UDPDR1= 177622
              177624                    UDPDR2= 177624
              177626                    UDPDR3= 177626
              177630                    UDPDR4= 177630
              177632                    UDPDR5= 177632
              177634                    UDPDR6= 177634
              177636                    UDPDR7= 177636
                                        ;*USER ''I'' PAGE ADDRESS REGISTERS
              177640                    UIPAR0= 177640
              177642                    UIPAR1= 177642
              177644                    UIPAR2= 177644
              177646                    UIPAR3= 177646
              177650                    UIPAR4= 177650
              177652                    UIPAR5= 177652
              177654                    UIPAR6= 177654
              177656                    UIPAR7= 177656
                                        ;*USER ''D'' PAGE ADDRESS REGISTERS
              177660                    UDPAR0= 177660
              177662                    UDPAR1= 177662
              177664                    UDPAR2= 177664
              177666                    UDPAR3= 177666
              177670                    UDPAR4= 177670
              177672                    UDPAR5= 177672
              177674                    UDPAR6= 177674
              177676                    UDPAR7= 177676
                                        ;*SUPERVISOR ''I'' PAGE DESCRIPTOR REGISTERS
              172200                    SIPDR0= 172200
              172202                    SIPDR1= 172202
              172204                    SIPDR2= 172204
              172206                    SIPDR3= 172206
              172210                    SIPDR4= 172210
              172212                    SIPDR5= 172212
              172214                    SIPDR6= 172214
              172216                    SIPDR7= 172216
                                        ;*SUPERVISOR ''D'' PAGE DESCRIPTOR REGISTERS
              172220                    SDPDR0= 172220
              172222                    SDPDR1= 172222
              172224                    SDPDR2= 172224
              172226                    SDPDR3= 172226
              172230                    SDPDR4= 172230
              172232                    SDPDR5= 172232
              172234                    SDPDR6= 172234
              172236                    SDPDR7= 172236
                                        ;*SUPERVISOR ''I'' PAGE ADDRESS REGISTERS
              172240                    SIPAR0= 172240
              172242                    SIPAR1= 172242
              172244                    SIPAR2= 172244
              172246                    SIPAR3= 172246
              172250                    SIPAR4= 172250
              172252                    SIPAR5= 172252
              172254                    SIPAR6= 172254
              172256                    SIPAR7= 172256
                                        ;*SUPERVISOR ''D'' PAGE ADDRESS REGISTERS
              172260                    SDPAR0= 172260
              172262                    SDPAR1= 172262
```

```
          172264              SDPAR2= 172264
          172266              SDPAR3= 172266
          172270              SDPAR4= 172270
          172272              SDPAR5= 172272
          172274              SDPAR6= 172274
          172276              SDPAR7= 172276
                              ;*KERNEL ''I'' PAGE DESCRIPTOR REGISTERS
          172300              KIPDR0= 172300
          172302              KIPDR1= 172302
          172304              KIPDR2= 172304
          172306              KIPDR3= 172306
          172310              KIPDR4= 172310
          172312              KIPDR5= 172312
          172314              KIPDR6= 172314
          172316              KIPDR7= 172316
                              ;*KERNEL ''D'' PAGE DESCRIPTOR REGISTERS
          172320              KDPDR0= 172320
          172322              KDPDR1= 172322
          172324              KDPDR2= 172324
          172326              KDPDR3= 172326
          172330              KDPDR4= 172330
          172332              KDPDR5= 172332
          172334              KDPDR6= 172334
          172336              KDPDR7= 172336
                              ;*KERNEL ''I'' PAGE ADDRESS REGISTERS
          172340              KIPAR0= 172340
          172342              KIPAR1= 172342
          172344              KIPAR2= 172344
          172346              KIPAR3= 172346
          172350              KIPAR4= 172350
          172352              KIPAR5= 172352
          172354              KIPAR6= 172354
          172356              KIPAR7= 172356
                              ;*KERNEL ''D'' PAGE ADDRESS REGISTERS
          172360              KDPAR0= 172360
          172362              KDPAR1= 172362
          172364              KDPAR2= 172364
          172366              KDPAR3= 172366
          172370              KDPAR4= 172370
          172372              KDPAR5= 172372
          172374              KDPAR6= 172374
          172376              KDPAR7= 172376
                              .SBTTL  UNIBUS MAP REGISTER DEFINITIONS
                              ;*THE LOWER 16 BITS OF THE MAP REGISTERS ARE LABELED 'MAPLXX'
                              ;*THE UPPER 6 BITS OF THE MAP REGISTERS ARE LABELED 'MAPHXX'
          170200              MAPL00 = 170200
          170202              MAPH00 = 170202
          170204              MAPL01 = 170204
          170206              MAPH01 = 170206
          170210              MAPL02 = 170210
          170212              MAPH02 = 170212
          170214              MAPL03 = 170214
          170216              MAPH03 = 170216
          170220              MAPL04 = 170220
          170222              MAPH04 = 170222
          170224              MAPL05 = 170224
          170226              MAPH05 = 170226
```

```
             170230                  MAPL06 = 170230
             170232                  MAPH06 = 170232
             170234                  MAPL07 = 170234
             170236                  MAPH07 = 170236
             170240                  MAPL10 = 170240
             170242                  MAPH10 = 170242
             170244                  MAPL11 = 170244
             170246                  MAPH11 = 170246
             170250                  MAPL12 = 170250
             170252                  MAPH12 = 170252
             170254                  MAPL13 = 170254
             170256                  MAPH13 = 170256
             170260                  MAPL14 = 170260
             170262                  MAPH14 = 170262
             170264                  MAPL15 = 170264
             170266                  MAPH15 = 170266
             170270                  MAPL16 = 170270
             170272                  MAPH16 = 170272
             170274                  MAPL17 = 170274
             170276                  MAPH17 = 170276
             170300                  MAPL20 = 170300
             170302                  MAPH20 = 170302
             170304                  MAPL21 = 170304
             170306                  MAPH21 = 170306
             170310                  MAPL22 = 170310
             170312                  MAPH22 = 170312
             170314                  MAPL23 = 170314
             170316                  MAPH23 = 170316
             170320                  MAPL24 = 170320
             170320                  MAPH24 = 170320
             170324                  MAPL25 = 170324
             170326                  MAPH25 = 170326
             170330                  MAPL26 = 170330
             170332                  MAPH26 = 170332
             170334                  MAPL27 = 170334
             170336                  MAPH27 = 170336
             170340                  MAPL30 = 170340
             170342                  MAPH30 = 170342
             170344                  MAPL31 = 170344
             170346                  MAPH31 = 170346
             170350                  MAPL32 = 170350
             170352                  MAPH32 = 170352
             170354                  MAPL33 = 170354
             170356                  MAPH33 = 170356
             170360                  MAPL34 = 170360
             170362                  MAPH34 = 170362
             170364                  MAPL35 = 170364
             170366                  MAPH35 = 170366
             170370                  MAPL36 = 170370
             170372                  MAPH36 = 170372
             170374                  MAPL37 = 170374
             170376                  MAPH37 = 170376
             170200                      MAPL0=MAPL00
             170202                      MAPH0=MAPH00
             170204                      MAPL1=MAPL01
             170206                      MAPH1=MAPH01
             170210                      MAPL2=MAPL02
             170212                             MAPH2=MAPH02
             170214                             MAPL3=MAPL03
             170216                             MAPH3=MAPH03
             170220                             MAPL4=MAPL04
             170222                             MAPH4=MAPH04
             170224                             MAPL5=MAPL05
             170226                             MAPH5=MAPH05
             170230                             MAPL6=MAPL06
             170232                             MAPH6=MAPH06
             170234                             MAPL7=MAPL07
             170236                             MAPH7=MAPH07
 123                                    .SBTTL  TRAP CATCHER
             000000                             .=0
                                        ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ".+2,HALT"
                                        ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                        ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
             000174                             .=174
     000174  000000                     DISPREG: .WORD  0                       ;;SOFTWARE DISPLAY REGISTER
     000176  000000                     SWREG:   .WORD  0                       ;;SOFTWARE SWITCH REGISTER
 124                                    .SBTTL  ACT11 HOOKS
                                        ;*****************************************************************************
                                        ;HOOKS REQUIRED BY ACT11
             000200                             $SVPC=.                         ;SAVE PC
             000046                             .=46
     000046  036040                             $ENDAD                          ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
             000052                             .=52
     000052  000000                             .WORD   0                       ;;2)SET LOC.52 TO ZERO
             000200                             .=$SVPC                         ;; RESTORE PC
 125         000300                             .=300
 126                                    .SBTTL  APT MAILBOX-ETABLE
                                        ;*****************************************************************************
                                        .EVEN
     000300                             $MAIL:                        ;;APT MAILBOX
     000300  000000                     $MSGTY: .WORD   AMSGTY        ;;MESSAGE TYPE CODE
     000302  000000                     $FATAL: .WORD   AFATAL        ;;FATAL ERROR NUMBER
     000304  000000                     $TESTN: .WORD   ATESTN        ;;TEST NUMBER
     000306  000000                     $PASS:  .WORD   APASS         ;;PASS COUNT
     000310  000000                     $DEVCT: .WORD   ADEVCT        ;;DEVICE COUNT
     000312  000000                     $UNIT:  .WORD   AUNIT         ;;I/O UNIT NUMBER
     000314  000000                     $MSGAD: .WORD   AMSGAD        ;;MESSAGE ADDRESS
     000316  000000                     $MSGLG: .WORD   AMSGLG        ;;MESSAGE LENGTH
     000320                             $ETABLE:                      ;;APT ENVIRONMENT TABLE
     000320     000                     $ENV:   .BYTE   AENV          ;;ENVIRONMENT BYTE
     000321     000                     $ENVM:  .BYTE   AENVM         ;;ENVIRONMENT MODE BITS
     000322  000000                     $SWREG: .WORD   ASWREG        ;;APT SWITCH REGISTER
     000324  000000                     $USWR:  .WORD   AUSWR         ;;USER SWITCHES
     000326  000000                     $CPUOP: .WORD   ACPUOP        ;;CPU TYPE,OPTIONS
                                        ;*                             BITS 15-11=CPU TYPE
                                        ;*                                     11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
                                        ;*                                     11/70=06,PDQ=07,Q=10
                                        ;*                             BIT 10=REAL TIME CLOCK
                                        ;*                             BIT  9=FLOATING POINT PROCESSOR
                                        ;*                             BIT  8=MEMORY MANAGEMENT
     000330                             $ETEND:
                                        .MEXIT
 127                                    .SBTTL  APT PARAMETER BLOCK
                                        ;*****************************************************************************
```

```
                                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                ;*******************************************************************************
        000330                          .$X=.   ;;SAVE CURRENT LOCATION
        000024                          .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
000024  000200                          200     ;;FOR APT START UP
        000044                          .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044  000330                          $APTHDR ;;POINT TO APT HEADER BLOCK
        000330                          .=.$X   ;;RESET LOCATION COUNTER
                                ;*******************************************************************************
                                ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                ;INTERFACE SPEC.
000330                          $APTHD:
000330  000000                  $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
000332  000300                  $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
000334  000010                  $TSTM:  .WORD   10      ;;RUN TIM OF LONGEST TEST
000336  000010                  $PASTM: .WORD   10      ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
000340  000000                  $UNITM: .WORD   0       ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
000342  000014                          .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
                                ;*******************************************************************************
                                ;SOME POINTERS TO CPU TRAP HANDLERS
                                ;*******************************************************************************
        000004                          .=4
000004  036370                          T04
000006  000000                          0
000010  036400                          T010
000012  000000                          0
000014  036410                          T014
000016  000000                          0
        000030                          .=30
000030  036420                          T030
000032  000000                          0
000034  036430                          T034
000036  000000                          0
        000114                          .=114
000114  036440                          T0114
000116  000000                          0
        000244                          .=244
000244  036450                          T0244
000246  000000                          0
000250  036460                          T0250
000252  000000                          0

                                ;*******************************************************************************
                                ;DATA TABLE FOR USE IN ADDRESSING MODE TESTS
                                ;*******************************************************************************
        000370                          .=370
000370  000000  000000  000000          0,0,0,0,0,0
000376  000000  000000  000000
000404  000001  000001  177777          1,1,-1
        001100                          .=1100
                                ;*******************************************************************************
                                ;SET UP STARTING ADDRESS
        001100                          .$X=.
        000200                          .=200
000200  000167  000674                  JMP     START

000204  012706  001000                  MOV     #STBOT,R6               ;SET STACK POINTER
```

```
000210  012702  000304                  MOV    #$TESTN,R2              ;SET MAILBOX POINTER
000214  000137                          JMP    @(PC)+                  ;JUMP TO SUBTEST
000216  000000                          0                              ;ADDR. OF SUBTEST GOES HERE

        001100                          .=.$X
        000302                  $ERROR=$FATAL
        000304                  $TSTNM=$TESTN
001100  012737  036254  000024  START:  MOV    #PWRDN,@#24             ;SET UP FOR POWER FAIL
001106  012737  000000  000306          MOV    #0,@#$PASS      ;CLEAR PASS COUNT
001114  012737  177777  036066          MOV    #-1,@#PASSPT    ;SET PRINT COUNTER
001122  012706  001000          RESTRT: MOV    #STBOT,R6       ;INITIALIZE STACK POINTER
001126  012702  000304                  MOV    #$TESTN,R2      ;SET UP POINTER TO MESSAGE TYPE
001132  012737  000000  000304          MOV    #0,@#$TSTNM     ;CLEAR TEST NUMBER
001140  012737  000000  000302          MOV    #0,@#$ERROR     ;CLEAR ERROR NUMBER
001146  012737  000000  000300          MOV    #0,@#$MSGTY     ;CLEAR MESSAGE TYPE(FOR APT)
```

```
                                ;**************************************************************************************
                                ;TEST 1 CHECK BRANCHES ON Z BIT
                                ;**************************************************************************************
001154  005212                  TST1:   INC     (R2)            ;UPDATE TEST NUMBER
001156  022712  000001                  CMP     #1,(R2)         ;SEQUENCE ERROR?
001162  001024                          BNE     TST2-10         ;BR TO ERROR HALT ON SEQ ERROR
001164  000257                          CCC                     ;CLEAR ALL CONDITION CODES
001166  001401                          BEQ     BR1             ;SHOULD BRANCH
001170  000404                          BR      BR2             ;BAD BRANCH OF Z-BIT
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           BRANCH INSTRUCTION AND          <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           FOLLOWING W/ 774                <====
001172                          BR1:
001172  012742  000001                  MOV     #1,-(R2)        ;MOVE TO MAILBOX #  *******  1  *******
001176  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
001200  000000                          HALT                    ;SHOULD HAVE BRANCHED: Z=0
001202                          BR2:
001202  001004                          BNE     BR3
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 767            <====
001204  012742  000002                  MOV     #2,-(R2)        ;MOVE TO MAILBOX #  *******  2  *******
001210  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
001212  000000                          HALT                    ;
001214  000264                  BR3:    SEZ
001216  001001                          BNE     BR4
001220  000404                          BR      BR5
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           BRANCH INSTRUCTION AND          <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           FOLLOWING W/ 760                <====
001222                          BR4:
001222  012742  000003                  MOV     #3,-(R2)        ;MOVE TO MAILBOX #  *******  3  *******
001226  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
001230  000000                          HALT                    ;SHOULD NOT HAVE BRANCHED HERE ON Z=1
001232                          BR5:
001232  001404                          BEQ     TST2
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 753            <====
001234  012742  000004                  MOV     #4,-(R2)        ;MOVE TO MAILBOX #  *******  4  *******
001240  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
001242  000000                          HALT                    ;SHOULD HAVE BRANCHED ON Z=1
                                                                ;  OR SEQUENCE ERROR

                                ;**************************************************************************************
                                .SBTTL  DATA PATH TESTS
                                ;
                                ;       THE DATA PATH TESTS ARE USED TO VERIFY THAT VARIOUS
                                ;DATA PATTERNS CAN BE SUCCESSFULLY MOVED THROUGH THE DATA PATHS
                                ;MOVE AND COMPARE MODE 2,3 INSTRUCTIONS ARE USED TO PASS AND
                                ;TEST VARIOUS DATA PATTERNS IN THE DATA PATHS.
                                ;       THE TEST EXERCISES THE INTERNAL DATA PATHS, THE UNIBUS
                                ;DATA TRANSCIEVERS, AND AMUX CONTROL FOR ALU AND UBUS INPUTS.
```

```
                                    ;       IF THESE TESTS FAIL, EXAMINE THE TARGET LOCATION (LOC. 0)
                                    ;TO SEE WHICH BITS OF THE DATA PATH ARE FAILING.  IF THIS PROVIDES
                                    ;INCONCLUSIVE DATA, TRY TO CHECK MODE 3 IR DECODE BY RUNNING
                                    ;JUST THE MICROCODE AND IR DECODE TESTS FOR THE MOVE AND COMPARE
                                    ;INSTRUCTIONS.
                                    ;*****************************************************************************
                                    ;TEST 2 TEST OF ZEROES IN THE DATA PATH
                                    ;*****************************************************************************
    001244  005212                  TST2:   INC     (R2)            ;UPDATE TEST NUMBER
    001246  022712  000002                  CMP     #2,(R2)         ;SEQUENCE ERROR?
    001252  001006                          BNE     TST3-10         ;BR TO ERROR HALT ON SEQ ERROR
    001254  012737  000000  000000          MOV     #0,@#0          ;MOVE ZEROES THRU ADDRESS LINES, DATA
                                                                    ;LINES AND INTERNAL PATHS
    001262  005737  000000                  TST     @#0             ;SUCCESSFUL?
    001266  001404                          BEQ     TST3

                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 771           <====
    001270  012742  000005                  MOV     #5,-(R2)        ;MOVE TO MAILBOX #  *******  5  *******
    001274  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    001276  000000                          HALT                    ;DATA INCORRECT
                                                                    ;  OR SEQUENCE ERROR


                                    ;*****************************************************************************
                                    ;TEST 3 TEST OF PATTERN 125252 IN DATA PATH
                                    ;*****************************************************************************
    001300  005212                  TST3:   INC     (R2)            ;UPDATE TEST NUMBER
    001302  022712  000003                  CMP     #3,(R2)         ;SEQUENCE ERROR?
    001306  001007                          BNE     TST4-10         ;BR TO ERROR HALT ON SEQ ERROR
    001310  012737  125252  000000          MOV     #125252,@#0     ;MOVE ALTERNATING ONES AND ZEROES
                                                                    ;THRU DATA PATHS
    001316  022737  125252  000000          CMP     #125252,@#0     ;SUCCESSFUL
    001324  001404                          BEQ     TST4

                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 770           <====
    001326  012742  000006                  MOV     #6,-(R2)        ;MOVE TO MAILBOX #  *******  6  *******
    001332  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    001334  000000                          HALT                    ;DATA INCORRECT
                                                                    ;  OR SEQUENCE ERROR


                                    ;*****************************************************************************
                                    ;TEST 4 TEST OF PATTERN 052525 IN DATA PATH
                                    ;*****************************************************************************
    001336  005212                  TST4:   INC     (R2)            ;UPDATE TEST NUMBER
    001340  022712  000004                  CMP     #4,(R2)         ;SEQUENCE ERROR?
    001344  001007                          BNE     TST5-10         ;BR TO ERROR HALT ON SEQ ERROR
    001346  012737  052525  000000          MOV     #052525,@#0     ;MOVE ALTERNATING ZEROES AND ONES
                                                                    ;THRU DATA PATH
    001354  022737  052525  000000          CMP     #052525,@#0     ;SUCCESSFUL?
    001362  001404                          BEQ     TST5

                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 770           <====
    001364  012742  000007                  MOV     #7,-(R2)        ;MOVE TO MAILBOX #  *******  7  *******
    001370  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    001372  000000                          HALT                    ;DATA INCORRECT
                                                                    ;  OR SEQUENCE ERROR

                                    ;*******************************************************************************
                                    ;TEST 5 TEST OF ALL ONES IN DATA PATH
                                    ;*******************************************************************************
    001374  005212                  TST5:   INC     (R2)            ;UPDATE TEST NUMBER
    001376  022712  000005                  CMP     #5,(R2)         ;SEQUENCE ERROR?
    001402  001007                          BNE     TST6-10         ;BR TO ERROR HALT ON SEQ ERROR
    001404  012737  177777  000000          MOV     #177777,@#0     ;MOVE ONES THRU DATA PATH
    001412  022737  177777  000000          CMP     #177777,@#0     ;SUCCESSFUL
    001420  001404                          BEQ     TST6
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 770            <====
    001422  012742  000010                  MOV     #10,-(R2)       ;MOVE TO MAILBOX #  *******  10  *******
    001426  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    001430  000000                          HALT                    ;DATA INCORRECT
                                                                    ;  OR SEQUENCE ERROR

                                    ;*******************************************************************************
                                    .SBTTL  B-REGISTER TEST
                                    ;
                                    ;       THE B-REGISTER SHIFTING LOGIC TESTS ARE USED TO TEST THAT THE
                                    ;B-REGISTER CAN HOLD VARIOUS DATA PATTERNS AND THAT THE ASSOCIATED
                                    ;LOGIC SUPPORTS THE SHIFTING FUNCTIONS WITHIN THE B-REGISTER AND C-BIT.
                                    ;A ONE IS SHIFTED THROUGH EVERY BIT IN THE B-REGISTER AND C-BIT IN
                                    ;BOTH DIRECTIONS.
                                    ;       THE B-REGISTER ITSELF IS TESTED IN ITS ABILITY AS A BUFFER AND AS
                                    ;A SHIFT REGISTER.  DATA IS ALSO PASSED THROUGH THE DATA PATH AND ALU.
                                    ;       IF THESE TESTS FAIL, EXAMINE THE TARGET LOCATION (LOC. 0) TO SEE
                                    ;WHICH BITS OF THE B-REGISTER MAY BE FAILING.  IF THIS PROVIDES
                                    ;INCONCLUSIVE DATA TRY TO CHECK THE MODE 3 IR DECODE BY RUNNING JUST
                                    ;THE MICROCODE AND IR DECODE TESTS FOR THE PARTICULAR INSTRUCTIONS.
                                    ;
                                    ;*******************************************************************************
                                    ;TEST 6 SHIFT BIT 0 TO BIT 1
                                    ;*******************************************************************************
    001432  005212                  TST6:   INC     (R2)            ;UPDATE TEST NUMBER
    001434  022712  000006                  CMP     #6,(R2)         ;SEQUENCE ERROR?
    001440  001012                          BNE     TST7-10         ;BR TO ERROR HALT ON SEQ ERROR
    001442  000241                          CLC                     ;CLEAR CARRY BIT
    001444  012737  000001  000000          MOV     #1,@#0          ;LOAD A 1
    001452  006137  000000                  ROL     @#0             ;SHIFT LEFT
    001456  022737  000002  000000          CMP     #2,@#0          ;SUCCESSFUL
    001464  001404                          BEQ     TST7
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 765            <====
    001466  012742  000011                  MOV     #11,-(R2)       ;MOVE TO MAILBOX #  *******  11  *******
    001472  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    001474  000000                          HALT                    ;BIT 1 NOT SET
                                                                    ;  OR SEQUENCE ERROR
    260
    261                                               ;*************************************************************************
                                                      ;TEST 7 SHIFT CARRY INTO BIT 0
                                                      ;*************************************************************************
        001476  005212                                TST7:   INC     (R2)            ;UPDATE TEST NUMBER
        001500  022712  000007                                CMP     #7,(R2)         ;SEQUENCE ERROR?
        001504  001017                                        BNE     TST10-10        ;BR TO ERROR HALT ON SEQ ERROR
    262 001506  012737  000000  000000                        MOV     #0,@#0          ;CLEAR LOCATION
    263 001514  000261                                        SEC                     ;SET CARRY
    264 001516  006137  000000                                ROL     @#0             ;ROTATE CARRY BIT TO BIT 0
    265 001522  103014                                        BCC     TST10
                                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                                      ;           WHICH FOLLOWS W/ 770            <====
        001524  012742  000012                                MOV     #12,-(R2)       ;MOVE TO MAILBOX #  *******  12  *******
        001530  005242                                        INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        001532  000000                                        HALT                    ;CARRY CLEAR
                                                                                      ;  OR SEQUENCE ERROR
    266 001534  022737  000001  000000                        CMP     #1,@#0          ;BIT 0 SET
    267 001542  001404                                        BEQ     TST10
                                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                                      ;           WHICH FOLLOWS W/ 760            <====
        001544  012742  000013                                MOV     #13,-(R2)       ;MOVE TO MAILBOX #  *******  13  *******
        001550  005242                                        INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        001552  000000                                        HALT                    ;BIT 0 NOT SET
                                                                                      ;  OR SEQUENCE ERROR
    268
    269                                               ;*************************************************************************
                                                      ;TEST 10          LEFT SHIFT FROM BIT 0 TO C-BIT
                                                      ;*************************************************************************
        001554  005212                                TST10:  INC     (R2)            ;UPDATE TEST NUMBER
        001556  022712  000010                                CMP     #10,(R2)        ;SEQUENCE ERROR?
        001562  001014                                        BNE     TST11-10        ;BR TO ERROR HALT ON SEQ ERROR
    270 001564  012737  000001  000000                        MOV     #1,@#0          ;SET BIT 0
    271 001572  012700  177757                                MOV     #-21,R0         ;SET BIT COUNTER
    272 001576  000241                                        CLC                     ;CLEAR C-BIT
    273 001600  005200                                SHL:    INC     R0              ;INCREMENT BIT COUNTER
    274 001602  001404                                        BEQ     SHLE            ;BR TO ERROR HALT IF BIT IS LOST
    275 001604  006137  000000                                ROL     @#0             ;SHIFT LEFT ONE POSITION
    276 001610  103373                                        BCC     SHL             ;BRANCH IF C-BIT NOT SET
    277 001612  001404                                        BEQ     TST11
                                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                                      ;           WHICH FOLLOWS W/ 763            <====
        001614                                        SHLE:
        001614  012742  000014                                MOV     #14,-(R2)       ;MOVE TO MAILBOX #  *******  14  *******
        001620  005242                                        INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        001622  000000                                        HALT                    ;LEFT SHIFTING LOGIC FAILED
                                                                                      ;  OR SEQUENCE ERROR
    278
    279                                               ;*************************************************************************
                                                      ;TEST 11          SHIFT BIT 15 TO BIT 14
                                                      ;*************************************************************************
    001624  005212                          TST11:  INC     (R2)            ;UPDATE TEST NUMBER
    001626  022712  000011                          CMP     #11,(R2)        ;SEQUENCE ERROR?
    001632  001012                                  BNE     TST12-10        ;BR TO ERROR HALT ON SEQ ERROR
280 001634  012737  100000  000000                  MOV     #100000,@#0     ;SET BIT 15
281 001642  000241                                  CLC                     ;CLEAR CARRY
282 001644  006037  000000                          ROR     @#0             ;SHIFT BIT 15 TO BIT 14
283 001650  022737  040000  000000                  CMP     #40000,@#0      ;SUCCESSFUL
284 001656  001404                                  BEQ     TST12
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 765            <====
    001660  012742  000015                          MOV     #15,-(R2)       ;MOVE TO MAILBOX #  *******  15  *******
    001664  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    001666  000000                                  HALT                    ;BIT 14 NOT SET
                                                                            ;  OR SEQUENCE ERROR
285
286                                         ;*******************************************************************************
                                            ;TEST 12            RIGHT SHIFT FROM BIT 15 TO C-BIT
                                            ;*******************************************************************************
    001670  005212                          TST12:  INC     (R2)            ;UPDATE TEST NUMBER
    001672  022712  000012                          CMP     #12,(R2)        ;SEQUENCE ERROR?
    001676  001014                                  BNE     TST13-10        ;BR TO ERROR HALT ON SEQ ERROR
287 001700  012737  100000  000000                  MOV     #100000,@#0     ;SET BIT 15
288 001706  012700  177757                          MOV     #-21,R0         ;SET BIT COUNTER
289 001712  000241                                  CLC                     ;CLEAR C-BIT
290 001714  005200                          SHR:    INC     R0              ;INCREMENT BIT COUNTER
291 001716  001404                                  BEQ     SHRE            ;BR TO ERROR HALT IF BIT IS LOST
292 001720  006037  000000                          ROR     @#0             ;ROTATE RIGHT ONE POSITION
293 001724  103373                                  BCC     SHR             ;BRANCH IF C-BIT CLEAR
294 001726  001404                                  BEQ     TST13
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 763            <====
    001730                                  SHRE:
    001730  012742  000016                          MOV     #16,-(R2)       ;MOVE TO MAILBOX #  *******  16  *******
    001734  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    001736  000000                                  HALT                    ;RIGHT SHIFT LOGIC FAILED
                                                                            ;  OR SEQUENCE ERROR
295
296                                         ;*******************************************************************************
297                                         .SBTTL  SCRATCH PAD TESTS
298                                         ;
299                                         ;       THE SCRATCH PAD TESTS ARE USED TO VERIFY THAT VARIOUS
300                                         ;DATA PATTERNS CAN BE SUCCESSFULLY HELD IN THE SCRATCH PAD
301                                         ;CIRCUITRY.  MOVE AND COMPARE INSTRUCTIONS ARE USED TO TEST THAT
302                                         ;R0 CAN HOLD VARIOUS DATA PATTERNS.  EACH DATA PATTERN IS
303                                         ;MOVED AND TESTED IN A SMALL LOOP CONVENIENT FOR SCOPING.  THE
304                                         ;SUCCESSFUL COMPLETION OF THESE TESTS SHOULD VERIFY THE CIRCUITRY EXTERNAL
305                                         ;TO THE SCRATCH PAD ITSELF.
306                                         ;       THE REMAINDER OF THE GENERAL REGISTERS ARE TESTED BY MOVING
307                                         ;A BIT INTO BIT 0 OF THE REGISTER AND SHIFTING IT LEFT ONE
308                                         ;BIT AT A TIME INTO THE CARRY BIT.  THE RESULT IS THEN CHECKED TO INSURE THAT
309                                         ;NO BITS WERE PICKED. THE PROCEDURE IS THEN REPEATED UNDER OPPOSITE
310                                         ;CONDITIONS. THE GENERAL REGISTER AND THE CARRY BIT ARE SET TO
311                                         ;ALL ONES, AND A ZERO IS SHIFTED LEFT FROM BIT 0 INTO THE CARRY BIT.
```

```
                              ;THE RESULT IS THEN CHECKED TO INSURE THAT NO ZEROES WERE PICKED.
                              ;       AT THIS POINT ALL OF THE GENERAL REGISTERS HAVE BEEN EXERCISED
                              ;AS WELL AS REGISTER 11.  REGISTERS 10 AND 12 HAVE BEEN ACCESSED BY
                              ;THE INSTRUCTIONS.  REGISTERS 13,14,AND 17 WILL BE TESTED LATER IN THE
                              ;MICROCODE TESTS.
                              ;       IF THE PATTERN TESTS WITH REGISTER 0 FAIL CHECK THE RESULTANT
                              ;DATA FOR A CLUE TO A FAULT IN THE EXTERNAL CIRCUITRY.  IF THE
                              ;PATTERN TESTS WITH R0 ARE SUCCESSFUL BUT THE TESTS WITH THE OTHER
                              ;REGISTERS FAIL, SUSPECT THE REGISTER SELECT LINES AND THEN THE SCRATCH
                              ;PAD ITSELF.
                              ;
                              ;******************************************************************************
                              ;TEST 13        TEST IF R0 CAN HOLD ALL ZEROES
                              ;******************************************************************************
 001740  005212               TST13:  INC     (R2)            ;UPDATE TEST NUMBER
 001742  022712  000013               CMP     #13,(R2)        ;SEQUENCE ERROR?
 001746  001004                       BNE     TST14-10        ;BR TO ERROR HALT ON SEQ ERROR

 001750  012700  000000               MOV     #0,R0           ;MOVE ZEROES TO R0
 001754  005700                       TST     R0              ;SUCCESSFUL?
 001756  001404                       BEQ     TST14
                                                              ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                              ;           CONDITIONAL BRANCH INST. AND   <====
                                                              ;           REPLACE THE MOVE INSTRUCTION   <====
                                                              ;           WHICH FOLLOWS W/ 773           <====
 001760  012742  000017               MOV     #17,-(R2)       ;MOVE TO MAILBOX #  *******  17  *******
 001764  005242                       INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
 001766  000000                       HALT                    ;R0 NOT 0
                                                              ;  OR SEQUENCE ERROR


                              ;******************************************************************************
                              ;TEST 14        TEST IF R0 CAN HOLD ONES AND ZEROES
                              ;******************************************************************************
 001770  005212               TST14:  INC     (R2)            ;UPDATE TEST NUMBER
 001772  022712  000014               CMP     #14,(R2)        ;SEQUENCE ERROR?
 001776  001005                       BNE     TST15-10        ;BR TO ERROR HALT ON SEQ ERROR
 002000  012700  125252               MOV     #125252,R0      ;MOVE ALTERNATING ONES AND ZEROES TO R0
 002004  020027  125252               CMP     R0,#125252      ;SUCCESSFUL?
 002010  001404                       BEQ     TST15
                                                              ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                              ;           CONDITIONAL BRANCH INST. AND   <====
                                                              ;           REPLACE THE MOVE INSTRUCTION   <====
                                                              ;           WHICH FOLLOWS W/ 772           <====
 002012  012742  000020               MOV     #20,-(R2)       ;MOVE TO MAILBOX #  *******  20  *******
 002016  005242                       INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
 002020  000000                       HALT                    ;R0 NOT 125252
                                                              ;  OR SEQUENCE ERROR


                              ;******************************************************************************
                              ;TEST 15        TEST IF R0 CAN HOLD ZEROES AND ONES
                              ;******************************************************************************
 002022  005212               TST15:  INC     (R2)            ;UPDATE TEST NUMBER
 002024  022712  000015               CMP     #15,(R2)        ;SEQUENCE ERROR?
 002030  001005                       BNE     TST16-10        ;BR TO ERROR HALT ON SEQ ERROR
 002032  012700  052525               MOV     #052525,R0      ;MOVE ALTERNATING ZEROES AND ONES TO R0
 002036  020027  052525               CMP     R0,#052525      ;SUCCESSFUL?
 002042  001404                       BEQ     TST16
```

```
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                  ;           CONDITIONAL BRANCH INST. AND    <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                  ;           WHICH FOLLOWS W/ 772            <====
     002044  012742  000021                 MOV     #21,-(R2)     ;MOVE TO MAILBOX #  *******  21   *******
     002050  005242                         INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
     002052  000000                         HALT                  ;R0 NOT 52525
                                                                  ;  OR SEQUENCE ERROR


                                    ;*************************************************************************
                                    ;TEST 16        TEST IF R0 CAN HOLD ALL ONES
                                    ;*************************************************************************
     002054  005212                 TST16:  INC     (R2)          ;UPDATE TEST NUMBER
     002056  022712  000016                 CMP     #16,(R2)      ;SEQUENCE ERROR?
     002062  001005                         BNE     TST17-10      ;BR TO ERROR HALT ON SEQ ERROR
     002064  012700  177777                 MOV     #177777,R0    ;MOVE ALL ONES TO R0
     002070  020027  177777                 CMP     R0,#177777    ;SUCCESSFUL?
     002074  001404                         BEQ     TST17
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                  ;           CONDITIONAL BRANCH INST. AND    <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                  ;           WHICH FOLLOWS W/ 772            <====
     002076  012742  000022                 MOV     #22,-(R2)     ;MOVE TO MAILBOX #  *******  22   *******
     002102  005242                         INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
     002104  000000                         HALT                  ;R0 NOT 177777
                                                                  ;  OR SEQUENCE ERROR


                                    ;*************************************************************************
                                    ;TEST 17        TEST IF R1 CAN HOLD A ONE IN ALL BITS
                                    ;*************************************************************************
     002106  005212                 TST17:  INC     (R2)          ;UPDATE TEST NUMBER
     002110  022712  000017                 CMP     #17,(R2)      ;SEQUENCE ERROR?
     002114  001012                         BNE     TST20-10      ;BR TO ERROR HALT ON SEQ ERROR
     002116  012701  000001                 MOV     #1,R1         ;SET BIT 0
     002122  012700  177757                 MOV     #-21,R0       ;SET BIT COUNTER
     002126  000241                         CLC                   ;CLEAR C-BIT
     002130  005200                 REG1:   INC     R0            ;INCREMENT BIT COUNTER
     002132  001403                         BEQ     REG1E         ;BR TO ERROR HALT IF BIT IS LOST
     002134  006101                         ROL     R1            ;ROTATE 1 POSITION
     002136  103374                         BCC     REG1          ;ALL DONE
     002140  001404                         BEQ     TST20
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                  ;           CONDITIONAL BRANCH INST. AND    <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                  ;           WHICH FOLLOWS W/ 765            <====
                                                                  ;
     002142                         REG1E:
     002142  012742  000023                 MOV     #23,-(R2)     ;MOVE TO MAILBOX #  *******  23   *******
     002146  005242                         INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
     002150  000000                         HALT                  ;FAILURE WITH R1
                                                                  ;  OR SEQUENCE ERROR


                                    ;*************************************************************************
                                    ;TEST 20        TEST IF R1 CAN HOLD A ZERO IN ALL BITS
                                    ;*************************************************************************
     002152  005212                 TST20:  INC     (R2)          ;UPDATE TEST NUMBER
     002154  022712  000020                 CMP     #20,(R2)      ;SEQUENCE ERROR?
     002160  001014                         BNE     TST21-10      ;BR TO ERROR HALT ON SEQ ERROR
```

```
    355 002162  012701  177776              MOV     #-2,R1          ;SET ALL ONES IN R1 EXCEPT FOR BIT 0
    356 002166  012700  177757              MOV     #-21,R0         ;SET BIT COUNTER
    357 002172  000261                      SEC                     ;SET C-BIT
    358 002174  005200              REG1A:  INC     R0              ;INCREMENT COUNTER
    359 002176  001405                      BEQ     R1ERR           ;BR TO ERROR HALT IF COUNTER=0
    360 002200  006101                      ROL     R1              ;ROTATE 1 POSITION
    361 002202  103774                      BCS     REG1A           ;CONTINUE UNTIL C-BIT IS CLEAR
    362 002204  022701  177777              CMP     #-1,R1          ;CHECK DATA IN R1
    363 002210  001404                      BEQ     TST21
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                    ;           CONDITIONAL BRANCH INST. AND      <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                    ;           WHICH FOLLOWS W/ 763              <====
        002212                      R1ERR:
        002212  012742  000024              MOV     #24,-(R2)       ;MOVE TO MAILBOX #  *******  24  *******
        002216  005242                      INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        002220  000000                      HALT                    ;FAILURE WITH R1
                                                                    ;  OR SEQUENCE ERROR
    364                             ;*******************************************************************************
                                    ;TEST 21        TEST IF R2 CAN HOLD A ONE IN ALL BITS
                                    ;*******************************************************************************
        002222  005212              TST21:  INC     (R2)            ;UPDATE TEST NUMBER
        002224  022712  000021              CMP     #21,(R2)        ;SEQUENCE ERROR?
        002230  001012                      BNE     REG2A-14                ;BR TO ERROR HALT ON SEQ ERROR
    365 002232  012702  000001              MOV     #1,R2           ;SET BIT 0
    366 002236  012700  177757              MOV     #-21,R0         ;SET BIT COUNTER
    367 002242  000241                      CLC                     ;CLEAR C-BIT
    368 002244  005200              REG2:   INC     R0              ;INCREMENT BIT COUNTER
    369 002246  001403                      BEQ     REG2A-14        ;BR TO ERROR HALT IF BIT IS LOST
    370 002250  006102                      ROL     R2              ;ROTATE 1 POSITION
    371 002252  103374                      BCC     REG2            ;ALL DONE
    372 002254  001406                      BEQ     REG2A
    373                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
    374                                                             ;           BRANCH INSTRUCTION AND            <====
    375                                                             ;           REPLACE THE MOVE INSTRUCTION      <====
    376                                                             ;           FOLLOWING W/ 771                  <====
    377 002256  012702  000304              MOV     #$TESTN,R2      ;RESTORE POINTER
    378 002262  012742  000025              MOV     #25,-(R2)       ;MOVE TO MAILBOX #  *******  25  *******
        002266  005242                      INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        002270  000000                      HALT                    ;FAILURE WITH R2
    379 002272  012702  000304      REG2A:  MOV     #$TESTN,R2              ;RESTORE POINTER
    380
    381                             ;*******************************************************************************
                                    ;TEST 22        TEST IF R2 CAN HOLD A ZERO IN ALL BITS
                                    ;*******************************************************************************
        002276  005212              TST22:  INC     (R2)            ;UPDATE TEST NUMBER
        002300  022712  000022              CMP     #22,(R2)        ;SEQUENCE ERROR?
        002304  001020                      BNE     TST23-10        ;BR TO ERROR HALT ON SEQ ERROR
    382 002306  012702  177776              MOV     #-2,R2          ;SET ALL ONES IN R2 EXCEPT FOR BIT 0
    383 002312  012700  177757              MOV     #-21,R0         ;SET BIT COUNTER
    384 002316  000261                      SEC                     ;SET C-BIT
    385 002320  005200              REG2B:  INC     R0              ;INCREMENT BIT COUNTER
    386 002322  001407                      BEQ     R2ERR           ;BR TO ERROR HALT IF COUNTER=0
    387 002324  006102                      ROL     R2              ;ROTATE 1 POSITION
    388 002326  103774                      BCS     REG2B           ;CONTINUE UNTIL C-BIT IS CLEAR
    389 002330  022702  177777              CMP     #-1,R2          ;CHECK DATA IN R2
    390 002334  001406                      BEQ     REG2C
```

```
002336  012702  000304              MOV     #$TESTN,R2          ;RESTORE POINTER
002342                      R2ERR:
002342  012742  000026              MOV     #26,-(R2)           ;MOVE TO MAILBOX #  *******  26  *******
002346  005242                      INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
002350  000000                      HALT                        ;FAILURE WITH R2
002352  012702  000304      REG2C:  MOV     #$TESTN,R2          ;RESTORE POINTER


                            ;*******************************************************************************
                            ;TEST 23        TEST IF R3 CAN HOLD A ONE IN ALL BITS
                            ;*******************************************************************************
002356  005212              TST23:  INC     (R2)                ;UPDATE TEST NUMBER
002360  022712  000023              CMP     #23,(R2)            ;SEQUENCE ERROR?
002364  001012                      BNE     TST24-10            ;BR TO ERROR HALT ON SEQ ERROR
002366  012703  000001              MOV     #1,R3               ;SET BIT 0
002372  012700  177757              MOV     #-21,R0             ;SET BIT COUNTER
002376  000241                      CLC                         ;CLEAR C-BIT
002400  005200              REG3:   INC     R0                  ;INCREMENT BIT COUNTER
002402  001403                      BEQ     REG3E               ;BR TO ERROR HALT IF BIT IS LOST
002404  006103                      ROL     R3                  ;ROTATE 1 POSITION
002406  103374                      BCC     REG3                ;ALL DONE
002410  001404                      BEQ     TST24

                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 765            <====
002412                      REG3E:
002412  012742  000027              MOV     #27,-(R2)           ;MOVE TO MAILBOX #  *******  27  *******
002416  005242                      INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
002420  000000                      HALT                        ;FAILURE WITH R3
                                                                ;  OR SEQUENCE ERROR


                            ;*******************************************************************************
                            ;TEST 24        TEST IF R3 CAN HOLD A ZERO IN ALL BITS
                            ;*******************************************************************************
002422  005212              TST24:  INC     (R2)                ;UPDATE TEST NUMBER
002424  022712  000024              CMP     #24,(R2)            ;SEQUENCE ERROR?
002430  001014                      BNE     TST25-10            ;BR TO ERROR HALT ON SEQ ERROR
002432  012703  177776              MOV     #-2,R3              ;SET ALL ONES IN R3 EXCEPT FOR BIT 0
002436  012700  177757              MOV     #-21,R0             ;SET BIT COUNTER
002442  000261                      SEC                         ;SET C-BIT
002444  005200              REG3A:  INC     R0                  ;INCREMENT BIT COUNTER
002446  001405                      BEQ     R3ERR               ;BR TO ERROR HALT IF COUNTER=0
002450  006103                      ROL     R3                  ;ROTATE 1 POSITION
002452  103774                      BCS     REG3A               ;CONTINUE UNTIL C-BIT IS CLEAR
002454  022703  177777              CMP     #-1,R3              ;CHECK DATA
002460  001404                      BEQ     TST25

                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 763            <====
002462                      R3ERR:
002462  012742  000030              MOV     #30,-(R2)           ;MOVE TO MAILBOX #  *******  30  *******
002466  005242                      INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
002470  000000                      HALT                        ;FAILURE WITH R3
                                                                ;  OR SEQUENCE ERROR


                            ;*******************************************************************************
```

```
                                        ;TEST 25        TEST IF R4 CAN HOLD A ONE IN ALL BITS
                                        ;*************************************************************************
    002472  005212                      TST25:  INC     (R2)            ;UPDATE TEST NUMBER
    002474  022712  000025                      CMP     #25,(R2)        ;SEQUENCE ERROR?
    002500  001012                              BNE     TST26-10        ;BR TO ERROR HALT ON SEQ ERROR
417 002502  012704  000001                      MOV     #1,R4           ;SET BIT 0
418 002506  012700  177757                      MOV     #-21,R0         ;SET BIT COUNTER
419 002512  000241                              CLC                     ;CLEAR C-BIT
420 002514  005200                      REG4:   INC     R0              ;INCREMENT BIT COUNTER
421 002516  001403                              BEQ     REG4E           ;BR TO ERROR HALT IF BIT IS LOST
422 002520  006104                              ROL     R4              ;ROTATE 1 POSITION
423 002522  103374                              BCC     REG4            ;ALL DONE
424 002524  001404                              BEQ     TST26

                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 765            <====
    002526                              REG4E:
    002526  012742  000031                      MOV     #31,-(R2)       ;MOVE TO MAILBOX #  *******  31  *******
    002532  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    002534  000000                              HALT                    ;FAILURE WITH R4
                                                                        ;  OR SEQUENCE ERROR
425
426                                     ;*************************************************************************
                                        ;TEST 26        TEST IF R4 CAN HOLD A ZERO IN ALL BITS
                                        ;*************************************************************************
    002536  005212                      TST26:  INC     (R2)            ;UPDATE TEST NUMBER
    002540  022712  000026                      CMP     #26,(R2)        ;SEQUENCE ERROR?
    002544  001014                              BNE     TST27-10        ;BR TO ERROR HALT ON SEQ ERROR
427 002546  012704  177776                      MOV     #-2,R4          ;SET ALL ONES IN R4 EXCEPT FOR BIT 0
428 002552  012700  177757                      MOV     #-21,R0         ;SET BIT COUNTER
429 002556  000261                              SEC                     ;SET C-BIT
430 002560  005200                      REG4A:  INC     R0              ;INCREMENT BIT COUNTER
431 002562  001405                              BEQ     R4ERR           ;BR TO ERROR HALT IF COUNTER=0
432 002564  006104                              ROL     R4              ;ROTATE 1 POSITION
433 002566  103774                              BCS     REG4A           ;CONTINUE UNTIL C-BIT IS CLEAR
434 002570  022704  177777                      CMP     #-1,R4          ;CHECK DATA
435 002574  001404                              BEQ     TST27

                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 763            <====
    002576                              R4ERR:
    002576  012742  000032                      MOV     #32,-(R2)       ;MOVE TO MAILBOX #  *******  32  *******
    002602  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    002604  000000                              HALT                    ;FAILURE WITH R4
                                                                        ;  OR SEQUENCE ERROR
436
437
438                                     ;*************************************************************************
                                        ;TEST 27        TEST IF R5 CAN HOLD A ONE IN ALL BITS
                                        ;*************************************************************************
    002606  005212                      TST27:  INC     (R2)            ;UPDATE TEST NUMBER
    002610  022712  000027                      CMP     #27,(R2)        ;SEQUENCE ERROR?
    002614  001012                              BNE     TST30-10        ;BR TO ERROR HALT ON SEQ ERROR
439 002616  012705  000001                      MOV     #1,R5           ;SET BIT 0
440 002622  012700  177757                      MOV     #-21,R0         ;SET BIT COUNTER
```

```
    002626  000241                          CLC                     ;CLEAR C-BIT
    002630  005200                  REG5:   INC     R0              ;INCREMENT BIT COUNTER
    002632  001403                          BEQ     REG5E           ;BR TO ERROR HALT IF BIT IS LOST
    002634  006105                          ROL     R5              ;ROTATE 1 POSITION
    002636  103374                          BCC     REG5            ;ALL DONE
    002640  001404                          BEQ     TST30
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 765            <====
    002642                          REG5E:
    002642  012742  000033                  MOV     #33,-(R2)       ;MOVE TO MAILBOX #  *******  33  *******
    002646  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    002650  000000                          HALT                    ;FAILURE WITH R5
                                                                    ;  OR SEQUENCE ERROR

                                    ;*******************************************************************************
                                    ;TEST 30        TEST IF R5 CAN HOLD A ZERO IN ALL BITS
                                    ;*******************************************************************************
    002652  005212                  TST30:  INC     (R2)            ;UPDATE TEST NUMBER
    002654  022712  000030                  CMP     #30,(R2)        ;SEQUENCE ERROR?
    002660  001014                          BNE     TST31-10        ;BR TO ERROR HALT ON SEQ ERROR
    002662  012705  177776                  MOV     #-2,R5          ;SET ALL ONES IN R5 EXCEPT FOR BIT 0
    002666  012700  177757                  MOV     #-21,R0         ;SET BIT COUNTER
    002672  000261                          SEC                     ;SET C-BIT
    002674  005200                  REG5A:  INC     R0              ;INCREMENT BIT COUNTER
    002676  001405                          BEQ     R5ERR           ;BR TO ERROR HALT IF COUNTER=0
    002700  006105                          ROL     R5              ;ROTATE 1 POSITION
    002702  103774                          BCS     REG5A           ;CONTINUE UNTIL C-BIT IS C;EAR
    002704  022705  177777                  CMP     #-1,R5          ;CHECK DATA
    002710  001404                          BEQ     TST31
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 763            <====
    002712                          R5ERR:
    002712  012742  000034                  MOV     #34,-(R2)       ;MOVE TO MAILBOX #  *******  34  *******
    002716  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    002720  000000                          HALT                    ;FAILURE WITH R5
                                                                    ;  OR SEQUENCE ERROR

                                    ;*******************************************************************************
                                    ;TEST 31        TEST IF R6 CAN HOLD A ONE IN ALL BITS
                                    ;*******************************************************************************
    002722  005212                  TST31:  INC     (R2)            ;UPDATE TEST NUMBER
    002724  022712  000031                  CMP     #31,(R2)        ;SEQUENCE ERROR?
    002730  001012                          BNE     TST32-10        ;BR TO ERROR HALT ON SEQ ERROR
    002732  012706  000001                  MOV     #1,R6           ;SET BIT 0
    002736  012700  177757                  MOV     #-21,R0         ;SET BIT COUNTER
    002742  000241                          CLC                     ;CLEAR C-BIT
    002744  005200                  REG6:   INC     R0              ;INCREMENT BIT COUNTER
    002746  001403                          BEQ     REG6E           ;BR TO ERROR HALT IF BIT IS LOST
    002750  006106                          ROL     R6              ;ROTATE 1 POSITION
    002752  103374                          BCC     REG6            ;ALL DONE
    002754  001404                          BEQ     TST32
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                 ;                 REPLACE THE MOVE INSTRUCTION    <====
                                                                 ;                 WHICH FOLLOWS W/ 765            <====
    002756                             REG6E:
    002756  012742  000035                     MOV     #35,-(R2)        ;MOVE TO MAILBOX #  *******  35  *******
    002762  005242                             INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
    002764  000000                             HALT                     ;FAILURE WITH R6
                                                                        ;  OR SEQUENCE ERROR

                                       ;*******************************************************************************
                                       ;TEST 32         TEST IF R6 CAN HOLD A ZERO IN ALL BITS
                                       ;*******************************************************************************
    002766  005212                     TST32:  INC     (R2)             ;UPDATE TEST NUMBER
    002770  022712  000032                     CMP     #32,(R2)         ;SEQUENCE ERROR?
    002774  001014                             BNE     TST33-10         ;BR TO ERROR HALT ON SEQ ERROR
    002776  012706  177776                     MOV     #-2,R6           ;SET ALL ONES IN R6 EXCEPT FOR BIT 0
    003002  012700  177757                     MOV     #-21,R0          ;SET BIT COUNTER
    003006  000261                             SEC                      ;SET C-BIT
    003010  005200                     REG6A:  INC     R0               ;INCREMENT BIT COUNT
    003012  001405                             BEQ     R6ERR            ;BR TO ERROR HALT IF COUNTER=0
    003014  006106                             ROL     R6               ;ROTATE 1 POSITION
    003016  103774                             BCS     REG6A            ;CONTINUE UNTIL C-BIT IS CLEAR
    003020  022706  177777                     CMP     #-1,R6           ;CHECK DATA
    003024  001404                             BEQ     TST33

                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;          CONDITIONAL BRANCH INST. AND    <====
                                                                        ;          REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;          WHICH FOLLOWS W/ 763            <====
    003026                             R6ERR:
    003026  012742  000036                     MOV     #36,-(R2)        ;MOVE TO MAILBOX #  *******  36  *******
    003032  005242                             INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
    003034  000000                             HALT                     ;FAILURE WITH R6
                                                                        ;  OR SEQUENCE ERROR

                                       ;*******************************************************************************
                                       .SBTTL  PSW TESTS
                                       ;
                                       ;       THE PSW TESTS ARE USED TO VERIFY THAT VARIOUS DATA
                                       ;PATTERNS CAN BE SUCCESSFULLY HELD IN THE PSW AND THAT THE
                                       ;PSW ADDRESSING LOGIC IS FUNCTIONING.  MOVE AND COMPARE INSTRUCTIONS
                                       ;ARE USED TO TEST THAT THE PSW CAN HOLD VARIOUS DATA PATTERNS.
                                       ;EACH DATA PATTERN IS MOVED AND TESTED IN A SMALL LOOP CONVENIENT FOR
                                       ;SCOPING.
                                       ;       THE PSW REGISTER ITSELF IS TESTED AS WELL AS THE ADDRESS
                                       ;SELECT CIRCUITRY.  THE AMUX INPUTS TO THE PSW MUX ARE TESTED.  THE
                                       ;CC INPUTS ARE TESTED LATER IN THE MICROCODE TESTS.  SETTING OF
                                       ;THE T-BIT BY THE TEST PATTERNS IS PURPOSELY AVOIDED; TESTING OF THE
                                       ;T-BIT TRAP CIRCUITRY IS LEFT FOR THE TRAP TEST.
                                       ;
                                       ;*******************************************************************************
                                       ;TEST 33         TEST IF PSW WILL HOLD ZEROES
                                       ;*******************************************************************************
    003036  005212                     TST33:  INC     (R2)             ;UPDATE TEST NUMBER
    003040  022712  000033                     CMP     #33,(R2)         ;SEQUENCE ERROR?
    003044  001010                             BNE     TST34-10         ;BR TO ERROR HALT ON SEQ ERROR
    003046  012706  001000                     MOV     #STBOT,R6
    003052  012737  000000  177776             MOV     #0,@#PS          ;SET PSW TO ZERO
    003060  005737  177776                     TST     @#PS             ;SUCCESSFUL
    003064  001404                          BEQ     TST34
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 767             <====
    003066  012742  000037                  MOV     #37,-(R2)       ;MOVE TO MAILBOX #  *******  37  *******
    003072  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    003074  000000                          HALT                    ;PSW NOT 0
                                                                    ;  OR SEQUENCE ERROR


                                    ;****************************************************************************
                                    ;TEST 34        TEST IF PSW WILL HOLD ONES AND ZEROES
                                    ;****************************************************************************
    003076  005212                  TST34:  INC     (R2)            ;UPDATE TEST NUMBER
    003100  022712  000034                  CMP     #34,(R2)        ;SEQUENCE ERROR?
    003104  001007                          BNE     TST35-10        ;BR TO ERROR HALT ON SEQ ERROR
    003106  012737  000252  177776          MOV     #252,@#PS       ;MOVE ALT. ONES AND ZEROES TO PSW
    003114  023727  177776  000252          CMP     @#PS,#252       ;SUCCESSFUL?
    003122  001404                          BEQ     TST35
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 770             <====
    003124  012742  000040                  MOV     #40,-(R2)       ;MOVE TO MAILBOX #  *******  40  *******
    003130  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    003132  000000                          HALT                    ;PSW NOT 252
                                                                    ;  OR SEQUENCE ERROR


                                    ;****************************************************************************
                                    ;TEST 35        TEST IF PSW (EXCEPT T-BIT) WILL HOLD 0'S & 1'S
                                    ;****************************************************************************
    003134  005212                  TST35:  INC     (R2)            ;UPDATE TEST NUMBER
    003136  022712  000035                  CMP     #35,(R2)        ;SEQUENCE ERROR?
    003142  001007                          BNE     TST36-10        ;BR TO ERROR HALT ON SEQ ERROR
    003144  012737  000105  177776          MOV     #105,@#PS       ;MOVE ALT. ONES AND ZEROES TO PSW
    003152  023727  177776  000105          CMP     @#PS,#105       ;SUCCESSFUL?
    003160  001404                          BEQ     TST36
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 770             <====
    003162  012742  000041                  MOV     #41,-(R2)       ;MOVE TO MAILBOX #  *******  41  *******
    003166  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    003170  000000                          HALT                    ;PSW NOT 105
                                                                    ;  OR SEQUENCE ERROR


                                    ;****************************************************************************
                                    ;TEST 36        TEST IF PSW (EXCEPT T-BIT) WILL HOLD ALL ONES
                                    ;****************************************************************************
    003172  005212                  TST36:  INC     (R2)            ;UPDATE TEST NUMBER
    003174  022712  000036                  CMP     #36,(R2)        ;SEQUENCE ERROR?
    003200  001007                          BNE     TST37-10        ;BR TO ERROR HALT ON SEQ ERROR
    003202  012737  000357  177776          MOV     #357,@#PS       ;MOVE ONES TO PSW
    003210  023727  177776  000357          CMP     @#PS,#357       ;SUCCESSFUL
    003216  001404                          BEQ     TST37
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;               REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;               WHICH FOLLOWS W/ 770             <====
003220  012742  000042                      MOV     #42,-(R2)       ;MOVE TO MAILBOX #  *******  42  *******
003224  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
003226  000000                              HALT                    ;PSW NOT 357
                                                                    ;  OR SEQUENCE ERROR
                                    .SBTTL  CONDITION CODE TEST

                                    ;*******************************************************************************
                                    ;
                                    ;       THIS TEST CHECKS THE CONDITIONAL BRANCHES INVOLVING THE Z-BIT.
                                    ;THE Z-BIT IS SET WITH ALL OTHER CC BITS ZERO AND BOTH CONDITIONS
                                    ;BEQ AND BNE ARE TESTED FOR PROPER EXECUTION.  THEN THE Z-BIT IS
                                    ;SET WITH ALL OTHER CC BITS CLEAR AND BOTH CONDITIONS ARE TESTED
                                    ;AGAIN FOR PROPER OPERATION.
                                    ;       THIS TEST CHECKS THE OPERATION OF THE SET AND CLEAR CONDITION
                                    ;CODE INSTRUCTIONS AND CHECKS THE CIRCUITRY EXTERNAL TO THE CONDITIONAL
                                    ;BRANCH ROM.  THE BRANCH MICROCODE FOR ALTERING THE PC AND FOR
                                    ;LEAVING THE PC UNALTERED IS TESTED.  ONLY THOSE ROM ADDRESSES SPECIFICALLY
                                    ;USED IN THE TEST ARE VERIFIED HERE.
                                    ;
                                    ;*******************************************************************************
                                    ;TEST 37        TEST BRANCHES AROUND Z-BIT
                                    ;*******************************************************************************
003230  005212                      TST37:  INC     (R2)            ;UPDATE TEST NUMBER
003232  022712  000037                      CMP     #37,(R2)        ;SEQUENCE ERROR?
003236  001014                              BNE     TST40-10        ;BR TO ERROR HALT ON SEQ ERROR
                                            ;FIRST WITH Z-BIT ON
003240  000257                              CCC                     ;CC=0100: JUST Z-BIT
003242  000264                              SEZ
003244  001001                              BNE     BRZ1            ;CHECK OPPOSITE CONDITION
003246  001404                              BEQ     BRZ2
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 773             <====
003250                              BRZ1:
003250  012742  000043                      MOV     #43,-(R2)       ;MOVE TO MAILBOX #  *******  43  *******
003254  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
003256  000000                              HALT                    ;IMPROPER BR W/ Z=1
                                            ;CHECK WITH Z-BIT OFF
003260  000277                      BRZ2:   SCC                     ;CC=1011: ALL BUT Z-BIT
003262  000244                              CLZ
003264  001401                              BEQ     BRZ3
003266  001004                              BNE     TST40
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 763             <====
003270                              BRZ3:
003270  012742  000044                      MOV     #44,-(R2)       ;MOVE TO MAILBOX #  *******  44  *******
003274  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
003276  000000                              HALT                    ;IMPROPER BR W/ Z=0
                                                                    ;  OR SEQUENCE ERROR

                                    ;*******************************************************************************
                                    ;
                                    ;        THIS TEST CHECKS THE CONDITIONAL BRANCHES INVOLVING THE N-BIT.
                                    ;THE N-BIT IS SET WITH ALL OTHER CC BITS ZERO AND BOTH CONDITIONS
                                    ;BMI AND BPL ARE TESTED FOR PROPER EXECUTION.  THEN THE N-BIT IS
                                    ;SET WITH ALL OTHER CC BITS CLEAR AND BOTH CONDITIONS ARE TESTED
                                    ;AGAIN FOR PROPER OPERATION.
                                    ;        THIS TEST CHECKS THE OPERATION OF THE SET AND CLEAR CONDITION
                                    ;CODE INSTRUCTIONS AND CHECKS THE CIRCUITRY EXTERNAL TO THE CONDITIONAL
                                    ;BRANCH ROM.  THE BRANCH MICROCODE FOR ALTERING THE PC AND FOR
                                    ;LEAVING THE PC UNALTERED IS TESTED.  ONLY THOSE ROM ADDRESSES SPECIFICALLY
                                    ;USED IN THE TEST ARE VERIFIED HERE.
                                    ;
                                    ;*******************************************************************************
                                    ;TEST 40         TEST BRANCHES AROUND N-BIT
                                    ;*******************************************************************************
 003300  005212                     TST40:  INC     (R2)                    ;UPDATE TEST NUMBER
 003302  022712  000040                     CMP     #40,(R2)                ;SEQUENCE ERROR?
 003306  001014                             BNE     TST41-10                ;BR TO ERROR HALT ON SEQ ERROR
                                            ;FIRST WITH N-BIT ON
 003310  000257                             CCC                             ;CC=1000: JUST N-BIT
 003312  000270                             SEN
 003314  100001                             BPL     BRN1                    ;CHECK OPPOSITE CONDITION
 003316  100404                             BMI     BRN2
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 773            <====
 003320                             BRN1:
 003320  012742  000045                     MOV     #45,-(R2)               ;MOVE TO MAILBOX #  *******  45  *******
 003324  005242                             INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
 003326  000000                             HALT                            ;IMPROPER BR W/ N=1
                                            ;CHECK WITH N-BIT OFF
 003330  000277                     BRN2:   SCC                             ;CC=0111
 003332  000250                             CLN
 003334  100401                             BMI     BRN3                    ;CHECK OPPOSITE CONDITION
 003336  100004                             BPL     TST41
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 763            <====
 003340                             BRN3:
 003340  012742  000046                     MOV     #46,-(R2)               ;MOVE TO MAILBOX #  *******  46  *******
 003344  005242                             INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
 003346  000000                             HALT                            ;IMPROPER BR W/ N=0
                                                                            ;  OR SEQUENCE ERROR

                                    ;*******************************************************************************
                                    ;
                                    ;        THIS TEST CHECKS THE CONDITIONAL BRANCHES INVOLVING THE V-BIT.
                                    ;THE V-BIT IS SET WITH ALL OTHER CC BITS ZERO AND BOTH CONDITIONS
                                    ;BVS AND BVC ARE TESTED FOR PROPER EXECUTION.  THEN THE V-BIT IS
                                    ;SET WITH ALL OTHER CC BITS CLEAR AND BOTH CONDITIONS ARE TESTED
                                    ;AGAIN FOR PROPER OPERATION.
                                    ;        THIS TEST CHECKS THE OPERATION OF THE SET AND CLEAR CONDITION
                                    ;CODE INSTRUCTIONS AND CHECKS THE CIRCUITRY EXTERNAL TO THE CONDITIONAL
                                    ;BRANCH ROM.  THE BRANCH MICROCODE FOR ALTERING THE PC AND FOR
                                    ;LEAVING THE PC UNALTERED IS TESTED.  ONLY THOSE ROM ADDRESSES SPECIFICALLY
                                    ;USED IN THE TEST ARE VERIFIED HERE.
```

```
                                   ;
                                   ;*************************************************************************
                                   ;TEST 41        TEST BRANCHES AROUND V-BIT
                                   ;*************************************************************************
 003350  005212                    TST41:  INC     (R2)            ;UPDATE TEST NUMBER
 003352  022712  000041                    CMP     #41,(R2)        ;SEQUENCE ERROR?
 003356  001014                            BNE     TST42-10        ;BR TO ERROR HALT ON SEQ ERROR
                                           ;FIRST WITH V-BIT ON
 003360  000257                            CCC                     ;CC=0010: JUST V-BIT
 003362  000262                            SEV
 003364  102001                            BVC     BRV1            ;CHECK OPPOSITE CONDITION
 003366  102404                            BVS     BRV2
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                   ;           CONDITIONAL BRANCH INST. AND   <====
                                                                   ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                   ;           WHICH FOLLOWS W/ 773           <====
 003370                            BRV1:
 003370  012742  000047                    MOV     #47,-(R2)       ;MOVE TO MAILBOX #  *******  47  *******
 003374  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
 003376  000000                            HALT                    ;IMPROPER BR W/ V=1
                                           ;CHECK WITH V-BIT OFF
 003400  000277                    BRV2:   SCC                     ;CC=1101: ALL BVT V-BIT
 003402  000242                            CLV
 003404  102401                            BVS     BRV3            ;CHECK OPPOSITE CONDITION
 003406  102004                            BVC     TST42
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                   ;           CONDITIONAL BRANCH INST. AND   <====
                                                                   ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                   ;           WHICH FOLLOWS W/ 763           <====
 003410                            BRV3:
 003410  012742  000050                    MOV     #50,-(R2)       ;MOVE TO MAILBOX #  *******  50  *******
 003414  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
 003416  000000                            HALT                    ;IMPROPER BR W/ V=0
                                                                   ;  OR SEQUENCE ERROR

                                   ;*************************************************************************
                                   ;
                                   ;       THIS TEST CHECKS THE CONDITIONAL BRANCHES INVOLVING THE C-BIT.
                                   ;THE C-BIT IS SET WITH ALL OTHER CC BITS ZERO AND BOTH CONDITIONS
                                   ;BCS AND BCC ARE TESTED FOR PROPER EXECUTION.  THEN THE C-BIT IS
                                   ;SET WITH ALL OTHER CC BITS CLEAR AND BOTH CONDITIONS ARE TESTED
                                   ;AGAIN FOR PROPER OPERATION.
                                   ;       THIS TEST CHECKS THE OPERATION OF THE SET AND CLEAR CONDITION
                                   ;CODE INSTRUCTIONS AND CHECKS THE CIRCUITRY EXTERNAL TO THE CONDITIONAL
                                   ;BRANCH ROM.  THE BRANCH MICROCODE FOR ALTERING THE PC AND FOR
                                   ;LEAVING THE PC UNALTERED IS TESTED.  ONLY THOSE ROM ADDRESSES SPECIFICALLY
                                   ;USED IN THE TEST ARE VERIFIED HERE.
                                   ;
                                   ;*************************************************************************
                                   ;TEST 42        TEST BRANCHES AROUND C-BIT
                                   ;*************************************************************************
 003420  005212                    TST42:  INC     (R2)            ;UPDATE TEST NUMBER
 003422  022712  000042                    CMP     #42,(R2)        ;SEQUENCE ERROR?
 003426  001014                            BNE     TST43-10        ;BR TO ERROR HALT ON SEQ ERROR
                                           ;FIRST WITH C-BIT ON
 003430  000257                            CCC                     ;CC=0001: JUST C-BIT
 003432  000261                            SEC
```

```
    003434  103001                  BCC     BRC1            ;CHECK OPPOSITE CONDITION
    003436  103404                  BCS     BRC2
                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                            ;           WHICH FOLLOWS W/ 773            <====
    003440                  BRC1:
    003440  012742  000051          MOV     #51,-(R2)       ;MOVE TO MAILBOX #  *******  51  *******
    003444  005242                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    003446  000000                  HALT                    ;IMPROPER BR W/ C=1
                                    ;CHECK WITH C-BIT OFF
    003450  000277          BRC2:   SCC                     ;CC=1110
    003452  000241                  CLC
    003454  103401                  BCS     BRC3            ;CHECK OPPOSITE CONDITION
    003456  100404                  BMI     TST43
                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                            ;           WHICH FOLLOWS W/ 763            <====
    003460                  BRC3:
    003460  012742  000052          MOV     #52,-(R2)       ;MOVE TO MAILBOX #  *******  52  *******
    003464  005242                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    003466  000000                  HALT                    ;IMPROPER BR W/ C=0
                                                            ;  OR SEQUENCE ERROR

                            ;*******************************************************************************
                            .SBTTL  MICROCODE TESTS
                            ;
                            ;       THE MICROCODE TESTS ARE USED TO VERIFY THE MICROPROGRAMM
                            ;FLOW.  THE GOAL OF THESE TESTS IS TO EXERCISE EVERY POSSIBLE
                            ;BRANCH IN THE MICROPROGRAM FLOW.
                            ;       THE TEST EXERCISES EVERY BRANCH IN THE MICROCODE BY
                            ;TESTING AT LEAST ONE INSTRUCTION FROM EVERY CLASS OF INSTRUCTION IN
                            ;ALL POSSIBLE MODES.  FOR EXAMPLE, TO TEST THE SINGLE OPERAND INSTRUCTIONS,
                            ;AT LEAST ONE SINGLE OPERAND INSTRUCTION IS VERIFIED IN ALL UNIQUE
                            ;ADDRESSING MODES.  BYTE MODES ARE ALSO TESTED.  AS EACH NEW
                            ;MODE IS INTRODUCED THE SAME INSTRUCTION IS TRIED AND TESTED IN
                            ;A SMALL LOOP CONVENIENT FOR SCOPING.  THE TEST IS SET UP USING
                            ;ONLY INSTRUCTIONS AND ADDRESSING MODES WHICH HAVE BEEN PREVIOUSLY
                            ;VERIFIED.
                            ;       IF THESE TESTS FAIL, CHECK THE RESULTS FOR A CLUE TO THE
                            ;FAULT.
                            ;
                            ;*******************************************************************************



                            ;*******************************************************************************
                            ;
                            ;       THE CLR INSTRUCTION IS USED TO INTRODUCE EACH ADDRESSING
                            ;MODE WITH THE SINGLE OPERAND INSTRUCTION.  FOLLOWING THE SEQUENCE CHECK,
                            ;THE CLR INSTRUCTION IS EXECUTED AND A BRANCH TEST IS EXECUTED WHICH
                            ;CHECKS THAT THE Z-BIT WAS PROPERLY SET.  THIS SMALL TEST IS SELF-SUFFICIENT
                            ;AND CAN BE SCOPED TO TROUBLE SHOOT ALL OF THE IR DECODE LOGIC AND
                            ;MICROCODE FOR SOP INSTRUCTIONS WITH MODE 0.  FOLLOWING THIS TEST
                            ;SEVERAL OTHER SOP INSTRUCTIONS ARE INTRODUCED WITH MODE 0.  THESE
                            ;INSTRUCTIONS MAINPULATE DATA AND SERVE TO CHECK THE DATA RESULTS
```

```
                                ;OF THE SOP INSTRUCTIONS IN THIS TEST.  THE DATA IN THIS TEST IS
                                ;OPERATED ON BY EACH INSTRUCTION WITHOUT REINITIALIZING.
                                ;
                                ;**********************************************************************************
                                ;TEST 43        TEST MODE 0 USING SOP INST.
                                ;**********************************************************************************
003470  005212                  TST43:  INC     (R2)            ;UPDATE TEST NUMBER
003472  022712  000043                  CMP     #43,(R2)        ;SEQUENCE ERROR?
003476  001020                          BNE     TST44-10        ;BR TO ERROR HALT ON SEQ ERROR
003500  005000                          CLR     R0              ;TRY THE CLEAR INST.
003502  001404                          BEQ     SOP0A
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 775             <====
003504  012742  000053                  MOV     #53,-(R2)       ;MOVE TO MAILBOX #  *******  53  *******
003510  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
003512  000000                          HALT                    ;CLR DID NOT SET Z-BIT
003514  005200                  SOP0A:  INC     R0              ;TRY THE INCREMENT INST.
003516  005100                          COM     R0              ;TRY COMPLEMENT
003520  005200                          INC     R0
003522  100404                          BMI     SOP0B
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 765             <====
003524  012742  000054                  MOV     #54,-(R2)       ;MOVE TO MAILBOX #  *******  54  *******
003530  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
003532  000000                          HALT                    ;NEGATE DID NOT SET N-BIT
003534  005100                  SOP0B:  COM     R0              ;TRY COMPLEMENT INST.
003536  001404                          BEQ     TST44
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 757             <====
003540  012742  000055                  MOV     #55,-(R2)       ;MOVE TO MAILBOX #  *******  55  *******
003544  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
003546  000000                          HALT                    ;CUMMULATIVE RESULT OF CLR,INC,NEG AND COM INSTS. FAILED
                                                                ;  OR SEQUENCE ERROR



                                ;**********************************************************************************
                                ;
                                        THIS TEST INTRODUCES THE REMAINING SOP INSTRUCIONS AND TESTS
                                ;THEM IN MODE 0.  THE PURPOSE IS TO PROVIDE A BASELINE OF
                                ;INSTRUCTIONS FOR USE IN THE SUBSEQUENT TESTS.  SINCE THE MICROCODE FOR
                                ;THESE INSTRUCTIONS IS IDENTICAL TO THAT ALREADY TESTED, ANY TROUBLE
                                ;SHOOTING EFFORTS SHOULD BE AIMED AT THE ACTUAL IR DECODE AND ALU
                                ;FUNCTIONING.
                                ;
                                ;**********************************************************************************
                                ;TEST 44        TEST REMAINDER OF SOP INSTS IN MODE 0
                                ;**********************************************************************************
003550  005212                  TST44:  INC     (R2)            ;UPDATE TEST NUMBER
003552  022712  000044                  CMP     #44,(R2)        ;SEQUENCE ERROR?
003556  001021                          BNE     TST45-10        ;BR TO ERROR HALT ON SEQ ERROR
003560  005000                          CLR     R0              ;INITIALIZE
```

```
    674 003562  005300                          DEC     R0              ;TRY DECREMENT INST.
    675 003564  100404                          BMI     SOP0C
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 774             <====
        003566  012742  000056                  MOV     #56,-(R2)       ;MOVE TO MAILBOX #  *******  56  *******
        003572  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        003574  000000                          HALT                    ;N-BIT NOT SET ON DEC
    676 003576  000261                  SOP0C:  SEC                     ;INITIALIZE CARRY
    677 003600  005500                          ADC     R0              ;TRY ADD CARRY INST
    678 003602  001007                          BNE     SOP0D
    679 003604  000261                          SEC                     ;INITIALIZE CARRY
    680 003606  005600                          SBC     R0              ;TRY SUBTRACT-CARRY INST
    681 003610  100004                          BPL     SOP0D
    682 003612  005100                          COM     R0
    683 003614  005200                          INC     R0
    684 003616  005300                          DEC     R0
    685 003620  001404                          BEQ     TST45
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 756             <====
        003622                          SOP0D:
        003622  012742  000057                  MOV     #57,-(R2)       ;MOVE TO MAILBOX #  *******  57  *******
        003626  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        003630  000000                          HALT                    ; CUMMULATIVE RESULT OF ADC,SBC,COM,INC AND DEC INSTS. FAILE
                                                                        ;  OR SEQUENCE ERROR
    686
    687                                 ;***********************************************************************************
    688                                 ;
    689                                 ;               THIS TEST INTRODUCES THE BYTE CONTROL LOGIC OF THE PROCESSOR.
    690                                 ;THE MODE 0 BYTE MICROCODE IS TESTED.  THE METHOD AND SEQUENCE
    691                                 ;OF TESTING IS THE SAME AS THAT USED IN THE SOP MODE 0 TESTS.
    692                                 ;
    693                                 ;***********************************************************************************
                                        ;TEST 45                TEST MODE 0 EVEN BYTE USING SOP INST
                                        ;***********************************************************************************
        003632  005212                  TST45:  INC     (R2)            ;UPDATE TEST NUMBER
        003634  022712  000045                  CMP     #45,(R2)        ;SEQUENCE ERROR?
        003640  001012                          BNE     TST46-10        ;BR TO ERROR HALT ON SEQ ERROR
    694 003642  105000                          CLRB    R0              ;TRY CLEARING EVEN BYTE OF REGISTER
    695 003644  001404                          BEQ     SOPB0A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 775             <====
        003646  012742  000060                  MOV     #60,-(R2)       ;MOVE TO MAILBOX #  *******  60  *******
        003652  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        003654  000000                          HALT                    ;CLRB DID NOT SET Z-BIT
    696 003656  105100                  SOPB0A: COMB    R0              ;TRY SETTING EVEN BYTE OF REGISTER
    697 003660  100002                          BPL     SOPB0B
    698 003662  105200                          INCB    R0              ;TRY INCREMENTING EVEN BYTE OF REGISTER>>
    699 003664  001404                          BEQ     TST46
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                              ;              WHICH FOLLOWS W/ 765          <====
 003666                            SOPB0B:
 003666  012742  000061                    MOV     #61,-(R2)         ;MOVE TO MAILBOX #  *******  61  *******
 003672  005242                            INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
 003674  000000                            HALT                      ;TEST CUMMULATIVE RESULT OF ABOVE BYTE INST.
                                                                     ;  OR SEQUENCE ERROR

                                   ;*******************************************************************************
                                   ;
                                   ;        THIS TEST USES THE CLR INSTRUCTION TO INTRODUCE AND TEST
                                   ;SINGLE OPERAND MODE 1 INSTRUCTIONS.  AGAIN, THE CLR INSTRUCTION
                                   ;IS USED TO INTRODUCE THE MICROCODE AND TO TEST THAT THE PROPER
                                   ;CONDITION CODES ARE SET.  OTHER SOP INSTRUCTIONS ARE USED TO MANIPULATE
                                   ;COMMON DATA TO VERIFY THAT THE CORRECT DATA IS PRODUCED.
                                   ;
                                   ;*******************************************************************************
                                   ;TEST 46         TEST MODE 1 USING SOP INST.
                                   ;*******************************************************************************
 003676  005212                    TST46:  INC     (R2)              ;UPDATE TEST NUMBER
 003700  022712  000046                    CMP     #46,(R2)          ;SEQUENCE ERROR?
 003704  001014                            BNE     TST47-10          ;BR TO ERROR HALT ON SEQ ERROR
 003706  005000                            CLR     R0                ;INITIALIZE R0
 003710  005010                            CLR     (R0)              ;TRY CLEAR INST W/MODE 1
 003712  001404                            BEQ     SOP1A

                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                     ;           CONDITIONAL BRANCH INST. AND    <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                     ;           WHICH FOLLOWS W/ 774            <====
 003714  012742  000062                    MOV     #62,-(R2)         ;MOVE TO MAILBOX #  *******  62  *******
 003720  005242                            INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
 003722  000000                            HALT                      ;CLR DID NOT SET Z-BIT
 003724  005310                    SOP1A:  DEC     (R0)              ;TRY DECREMENT INST W/MODE 1
 003726  100003                            BPL     SOP1B
 003730  000261                            SEC
                                                                     ;INITIALIZE CARRY
 003732  005510                            ADC     (R0)              ;TRY ADD-CARRY W/MODE 1
 003734  001404                            BEQ     TST47

                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                     ;           CONDITIONAL BRANCH INST. AND    <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                     ;           WHICH FOLLOWS W/ 763            <====
 003736                            SOP1B:
 003736  012742  000063                    MOV     #63,-(R2)         ;MOVE TO MAILBOX #  *******  63  *******
 003742  005242                            INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
 003744  000000                            HALT                      ;TEST CUMMULATIVE RESULT OF ABOVE INST
                                                                     ;  OR SEQUENCE ERROR

                                   ;*******************************************************************************
                                   ;
                                   ;        THIS TEST VERIFIES THE BYTE INSTRUCTION MICROCODE FOR MODE 1
                                   ;SINGLE OPERAND INSTRUCTIONS.
                                   ;        THIS IS THE FIRST PLACE THE SIGN EXTEND LOGIC IS EXERCISED
                                   ;AND VERIFIED.
                                   ;
                                   ;*******************************************************************************
                                   ;TEST 47         TEST MODE 1 EVEN BYTE USING SOP INST
                                   ;*******************************************************************************
 003746  005212                    TST47:  INC     (R2)              ;UPDATE TEST NUMBER
```

```
    003750  022712  000047                  CMP     #47,(R2)        ;SEQUENCE ERROR?
    003754  001020                          BNE     TST50-10        ;BR TO ERROR HALT ON SEQ ERROR
    003756  005000                          CLR     R0              ;INITIALIZE R0
    003760  005010                          CLR     (R0)            ;INITIALIZE LOC. 0
    003762  005110                          COM     (R0)
    003764  105010                          CLRB    (R0)            ;TRY TO CLEAR BYTE 0
    003766  001404                          BEQ     SOPB1A
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 772            <====
    003770  012742  000064                  MOV     #64,-(R2)       ;MOVE TO MAILBOX #  *******  64  *******
    003774  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    003776  000000                          HALT                    ;CLRB DID NOT SET Z-BIT
    004000  005210                  SOPB1A: INC     (R0)            ;INCREMENT TO TEST WORD
    004002  100005                          BPL     SOPB1B
    004004  105110                          COMB    (R0)            ;COMPLEMENT:  ODD BYTE = 376
    004006  105210                          INCB    (R0)            ;INC:  ODD BYTE = 377
    004010  100002                          BPL     SOPB1B
    004012  105210                          INCB    (R0)            ;INCREMENT ODD BYTE=0
    004014  001404                          BEQ     TST50
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 757            <====
    004016                          SOPB1B:
    004016  012742  000065                  MOV     #65,-(R2)       ;MOVE TO MAILBOX #  *******  65  *******
    004022  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    004024  000000                          HALT                    ;CHECK CUMMULATIVE RESULT OF ABOVE INST
                                                                    ;  OR SEQUENCE ERROR


                                    ;*******************************************************************************
                                    ;
                                    ;       THIS TEST VERIFIES THAT SINGLE OPERAND BYTE INSTRUCTIONS WILL
                                    ;FUNCTION CORRECTLY FOR ODD BYTES.
                                    ;       THIS IS THE FIRST TIME THAT ADDRESS LINE 0 HAS BEEN
                                    ;EXERCISED.  CHECKS ARE MADE THAT THE PROPER BYTE IS MODIFIED AND
                                    ;THE CONDITION CODES ARE CHECKED.  IT IS ALSO VERIFIED THAT THE UNADDRESSED
                                    ;BYTE IS NOT ALTERED BY THE INSTRUCTION.
                                    ;
                                    ;*******************************************************************************
                                    ;TEST 50        TEST MODE 1 ODD BYTE USING SOP INST
                                    ;*******************************************************************************
    004026  005212                  TST50:  INC     (R2)            ;UPDATE TEST NUMBER
    004030  022712  000050                  CMP     #50,(R2)        ;SEQUENCE ERROR?
    004034  001022                          BNE     TST51-10        ;BR TO ERROR HALT ON SEQ ERROR
    004036  005000                          CLR     R0              ;INITIALIZE R0
    004040  005010                          CLR     (R0)            ;INITIALIZE LOC. 0
    004042  005110                          COM     (R0)
    004044  005200                          INC     R0              ;R0=ODD BYTE
    004046  105010                          CLRB    (R0)            ;TRY TO CLEAR BYTE 1
    004050  001404                          BEQ     SOPB1C
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 771            <====
    004052  012742  000066               MOV     #66,-(R2)          ;MOVE TO MAILBOX #  *******  66  *******
    004056  005242                       INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
    004060  000000                       HALT                       ;CLRB DID NOT SET Z-BIT
    004062  005300              SOPB1C:  DEC     R0                 ;R0=WORD ADDR.
    004064  005210                       INC     (R0)               ;INCREMENT TO TEST WORD
    004066  005200                       INC     R0                 ;R0=ODD BYTE
    004070  105110                       COMB    (R0)               ;TRY TO COMPLEMENT BYTE 1
    004072  105210                       INCB    (R0)
    004074  100002                       BPL     SOPB1D
    004076  105210                       INCB    (R0)               ;TRY TO INCREMENT BYTE 1
    004100  001404                       BEQ     TST51

                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 755            <====
    004102                      SOPB1D:
    004102  012742  000067               MOV     #67,-(R2)          ;MOVE TO MAILBOX #  *******  67  *******
    004106  005242                       INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
    004110  000000                       HALT                       ;TEST CUMMULATIVE RESULT OF ABOVE INST.
                                                                    ;  OR SEQUENCE ERROR

                                ;*******************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 2 SINGLE-OPERAND INSTRUCTIONS.  PREVIOUSLY
                                ;TESTED INSTRUCTIONS ARE USED TO SET A POINTER IN R0 TO LOC. 400.
                                ;LOC. 400 IS INITIALIZED TO -1 BEFORE A CLR MODE 2 IS EXECUTED.
                                ;       THEN R0 IS DECREMENTED BY TWO TO AGAIN POINT TO 400 BEFORE EACH
                                ;OF SEVERAL MODE 2 INSTRUCTIONS ARE USED TO VERIFY THE DATA RESULTS OF
                                ;THE TEST.  THIS PROCEDURE ALSO VERIFIES THE PROPER INCREMENTING OF THE
                                ;REGISTER.
                                ;
                                ;*******************************************************************************
                                ;TEST 51        TEST MODE 2 USING SOP INST.
                                ;*******************************************************************************
    004112  005212              TST51:   INC     (R2)               ;UPDATE TEST NUMBER
    004114  022712  000051               CMP     #51,(R2)           ;SEQUENCE ERROR?
    004120  001023                       BNE     TST52-10           ;BR TO ERROR HALT ON SEQ ERROR
    004122  005000                       CLR     R0                 ;SET R0=400
    004124  105100                       COMB    R0
    004126  005200                       INC     R0
    004130  005010                       CLR     (R0)               ;CLEAR 400
    004132  005110                       COM     (R0)               ;INITIALIZE: 400=-1
    004134  005020                       CLR     (R0)+              ;TRY CLEARING WITH MODE 2
    004136  001404                       BEQ     SOP2A

                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 770            <====
    004140  012742  000070               MOV     #70,-(R2)          ;MOVE TO MAILBOX #  *******  70  *******
    004144  005242                       INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
    004146  000000                       HALT                       ;CLR INST DID NOT SET Z-BIT
    004150  005300              SOP2A:   DEC     R0                 ;RESET R0
    004152  005300                       DEC     R0
    004154  005120                       COM     (R0)+              ;TRY COMPLEMENTING WITH MODE 2
    004156  100004                       BPL     SOP2B
    004160  005300                       DEC     R0                 ;RESET R0
    004162  005300                       DEC     R0
```

```
  790 004164  005220                      INC     (R0)+           ;TRY INCREMENTING WITH MODE 2
  791 004166  001404                      BEQ     TST52
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                  ;           CONDITIONAL BRANCH INST. AND      <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                  ;           WHICH FOLLOWS W/ 754              <====
      004170                      SOP2B:
      004170  012742  000071              MOV     #71,-(R2)       ;MOVE TO MAILBOX #  *******  71  *******
      004174  005242                      INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      004176  000000                      HALT                    ;CHECK CUMMULATIVE RESULT OF ABOVE INST
                                                                  ;  OR SEQUENCE ERROR
  792
  793                             ;*******************************************************************************
  794                             ;
  795                             ;       THIS TEST VERIFIES MODE 2 SINGLE OPERAND INSTRUCTIONS WHICH
  796                             ;ADDRESS EVEN BYTES.  R0 IS SET TO 400 AND USED TO INITIALIZE LOCATION
  797                             ;400 TO -1.  CLRB INSTRUCTION IS THEN EXECUTED ON BYTE 400 WITH
  798                             ;MODE 2.
  799                             ;       R0 IS THEN DECREMENTED BEFORE EACH OF SEVERAL MODE 2 INSTRUCTIONS
  800                             ;WHICH ARE USED TO VERIFY THE DATA RESULTS OF THE TEST.  THIS PROCEDURE ALSO
  801                             ;VERIFIES THE PROPER INCREMENTING OF THE REGISTER.
  802                             ;
  803                             ;*******************************************************************************
                                  ;TEST 52         TEST MODE 2 EVEN BYTE USING SOP INST.
                                  ;*******************************************************************************
      004200  005212              TST52:  INC     (R2)            ;UPDATE TEST NUMBER
      004202  022712  000052              CMP     #52,(R2)        ;SEQUENCE ERROR?
      004206  001023                      BNE     TST53-10        ;BR TO ERROR HALT ON SEQ ERROR
  804 004210  005000                      CLR     R0              ;SET R0=400
  805 004212  105100                      COMB    R0
  806 004214  005200                      INC     R0
  807 004216  005010                      CLR     (R0)            ;CLEAR 400
  808 004220  005110                      COM     (R0)            ;INITIALIZE: 400=-1
  809 004222  105020                      CLRB    (R0)+           ;TRY TO CLEAT 400 W/MODE 2
  810 004224  001404                      BEQ     SOPB2A
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                  ;           CONDITIONAL BRANCH INST. AND      <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                  ;           WHICH FOLLOWS W/ 770              <====
      004226  012742  000072              MOV     #72,-(R2)       ;MOVE TO MAILBOX #  *******  72  *******
      004232  005242                      INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      004234  000000                      HALT                    ;CLR DID NOT SET Z-BIT
  811 004236  005300              SOPB2A: DEC     R0              ;RESULT R0=400
  812 004240  005210                      INC     (R0)            ;INC 400 TO TEST WORD
  813 004242  105110                      COMB    (R0)
  814 004244  105220                      INCB    (R0)+           ;TRY TO INC EVEN BYTE
  815 004246  100003                      BPL     SOPB2B
  816 004250  005300                      DEC     R0              ;RESET R0=400
  817 004252  105220                      INCB    (R0)+           ;TRY INCREMENT OF EVEN BYTE
  818 004254  001404                      BEQ     TST53
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                  ;           CONDITIONAL BRANCH INST. AND      <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                  ;           WHICH FOLLOWS W/ 754              <====
      004256                      SOPB2B:
      004256  012742  000073              MOV     #73,-(R2)       ;MOVE TO MAILBOX #  *******  73  *******
      004262  005242                      INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
```

```
004264  000000                  HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE INST.
                                                        ;  OR SEQUENCE ERROR

                        ;*******************************************************************************
                        ;
                        ;       THIS TEST FOLLOWS THE SAME PROCEDURE DESCRIBED IN THE PREVIOUS
                        ;TEST.  HERE, THE BYTE INSTRUCTION IS USED TO ADDRESS AN ODD BYTE.
                        ;
                        ;*******************************************************************************
                        ;TEST 53        TEST MODE 2 ODD BYTE USING SOP INST.
                        ;*******************************************************************************
004266  005212          TST53:  INC     (R2)            ;UPDATE TEST NUMBER
004270  022712  000053          CMP     #53,(R2)        ;SEQUENCE ERROR?
004274  001026                  BNE     TST54-10        ;BR TO ERROR HALT ON SEQ ERROR
004276  005000                  CLR     R0              ;SET R0=400
004300  105100                  COMB    R0
004302  005200                  INC     R0
004304  005010                  CLR     (R0)            ;CLEAR LOC 400
004306  005110                  COM     (R0)            ;INITIALIZE: 400=-1
004310  005200                  INC     R0              ;R0=ODD BYTE
004312  105020                  CLRB    (R0)+           ;TRY TO CLEAR ODD BYTE
004314  001404                  BEQ     SOPB2C
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                        ;           WHICH FOLLOWS W/ 767             <====
004316  012742  000074          MOV     #74,-(R2)       ;MOVE TO MAILBOX #  *******  74  *******
004322  005242                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
004324  000000                  HALT                    ;CLRB DID NOT SET Z-BIT
004326  005300          SOPB2C: DEC     R0              ;R0=WORD ADDR.
004330  005300                  DEC     R0
004332  005220                  INC     (R0)+           ;INCREMENT WORD
```

```
    838 004334  005300                          DEC     R0                  ;POINT TO ODD BYTE
    839 004336  105110                          COMB    (R0)                ;COMPLEMENT ODD BYTE
    840 004340  105220                          INCB    (R0)+               ;TRY TO INCREMENT ODD BYTE
    841 004342  100003                          BPL     SOPB2D
    842 004344  005300                          DEC     R0                  ;RESET R0 TO ODD BYTE
    843 004346  105220                          INCB    (R0)+               ;TRY TO INCREMENT ODD BYTE
    844 004350  001404                          BEQ     TST54
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                            ;          CONDITIONAL BRANCH INST. AND     <====
                                                                            ;          REPLACE THE MOVE INSTRUCTION     <====
                                                                            ;          WHICH FOLLOWS W/ 751             <====
        004352                          SOPB2D:
        004352  012742  000075                  MOV     #75,-(R2)           ;MOVE TO MAILBOX #  *******  75  *******
        004356  005242                          INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
        004360  000000                          HALT                        ;TEST CUMMULATIVE RESULT OF ABOVE INST.
                                                                            ;  OR SEQUENCE ERROR
    845
    846                                 ;*******************************************************************************
    847                                 ;
    848                                 ;          THESE TESTS CHECK THE NEGATE INSTRUCTION IN ALL MODES.  PREVIOUSLY
    849                                 ;TESTED SINGLE-OPERAND INSTRUCTIONS ARE USED TO TEST THE NEGATE INSTRUCTION.
    850                                 ;
    851                                 ;*******************************************************************************
                                        ;TEST 54           TEST MODE 0 USING NEGATE INSTRUCTION
                                        ;*******************************************************************************
        004362  005212                  TST54:  INC     (R2)                ;UPDATE TEST NUMBER
        004364  022712  000054                  CMP     #54,(R2)            ;SEQUENCE ERROR?
        004370  001035                          BNE     TST55-10            ;BR TO ERROR HALT ON SEQ ERROR
    852 004372  005000                          CLR     R0                  ;SET R0=0
    853 004374  005200                          INC     R0                  ;    R0=1
    854 004376  005400                          NEG     R0                  ;TRY NEGATE MODE 0:  R0=-1
    855 004400  100003                          BPL     NEG00               ;CC=1001?
    856 004402  001402                          BEQ     NEG00
    857 004404  102401                          BVS     NEG00
    858 004406  103404                          BCS     NEG01
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                            ;          CONDITIONAL BRANCH INST. AND     <====
                                                                            ;          REPLACE THE MOVE INSTRUCTION     <====
                                                                            ;          WHICH FOLLOWS W/ 770             <====
        004410                          NEG00:
        004410  012742  000076                  MOV     #76,-(R2)           ;MOVE TO MAILBOX #  *******  76  *******
        004414  005242                          INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
        004416  000000                          HALT                        ;NEGATE DID NOT SET CC'S CORRECTLY
    859
    860 004420  005200                  NEG01:  INC     R0                  ;TEST DATA RESULT
    861 004422  001404                          BEQ     NEG02
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                            ;          CONDITIONAL BRANCH INST. AND     <====
                                                                            ;          REPLACE THE MOVE INSTRUCTION     <====
                                                                            ;          WHICH FOLLOWS W/ 762             <====
        004424  012742  000077                  MOV     #77,-(R2)           ;MOVE TO MAILBOX #  *******  77  *******
        004430  005242                          INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
        004432  000000                          HALT                        ;DATA RESULT OF NEGATE INCORRECT
    862
    863 004434  105100                  NEG02:  COMB    R0                  ;R0=377
    864 004436  105400                          NEGB    R0                  ;R0=1
    865 004440  100403                          BMI     NEG03               ;CC=0001?
    004442  001402                    BEQ     NEG03
    004444  102401                    BVS     NEG03
    004446  103404                    BCS     NEG04
                                                              ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                              ;           CONDITIONAL BRANCH INST. AND    <====
                                                              ;           REPLACE THE MOVE INSTRUCTION    <====
                                                              ;           WHICH FOLLOWS W/ 750            <====
    004450                    NEG03:
    004450  012742  000100            MOV     #100,-(R2)      ;MOVE TO MAILBOX #  *******  100  *******
    004454  005242                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    004456  000000                    HALT                    ;NEGB DID NOT SET CC'S CORRECTLY
    004460  005300            NEG04:  DEC     R0              ;TEST DATA RESULT
    004462  001404                    BEQ     TST55
                                                              ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                              ;           CONDITIONAL BRANCH INST. AND    <====
                                                              ;           REPLACE THE MOVE INSTRUCTION    <====
                                                              ;           WHICH FOLLOWS W/ 742            <====
    004464  012742  000101            MOV     #101,-(R2)      ;MOVE TO MAILBOX #  *******  101  *******
    004470  005242                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    004472  000000                    HALT                    ;DATA RESULT OF NEGB INCORRECT
                                                              ;  OR SEQUENCE ERROR
                              ;*******************************************************************************
                              ;TEST 55          TEST MODE 1 USING NEGATE INST.
                              ;*******************************************************************************
    004474  005212            TST55:  INC     (R2)            ;UPDATE TEST NUMBER
    004476  022712  000055            CMP     #55,(R2)        ;SEQUENCE ERROR?
    004502  001040                    BNE     TST56-10        ;BR TO ERROR HALT ON SEQ ERROR
    004504  005000                    CLR     R0              ;POINT TO LOC. 0
    004506  005010                    CLR     (R0)            ;CLEAR LOC. 0
    004510  005210                    INC     (R0)            ;LOC. 0=1
    004512  005410                    NEG     (R0)            ;TRY NEG. LOC. 0=-1
    004514  100003                    BPL     NEG10           ;CC=1001
    004516  001402                    BEQ     NEG10
    004520  102401                    BVS     NEG10
    004522  103404                    BCS     NEG11
                                                              ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                              ;           CONDITIONAL BRANCH INST. AND    <====
                                                              ;           REPLACE THE MOVE INSTRUCTION    <====
                                                              ;           WHICH FOLLOWS W/ 767            <====
    004524                    NEG10:
    004524  012742  000102            MOV     #102,-(R2)      ;MOVE TO MAILBOX #  *******  102  *******
    004530  005242                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    004532  000000                    HALT                    ;NEGATE DID NOT SET CC'S CORRECTLY

    004534  005237  000000    NEG11:  INC     @#0             ;TEST DATA RESULT
    004540  001404                    BEQ     NEG12
                                                              ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                              ;           CONDITIONAL BRANCH INST. AND    <====
                                                              ;           REPLACE THE MOVE INSTRUCTION    <====
                                                              ;           WHICH FOLLOWS W/ 760            <====
    004542  012742  000103            MOV     #103,-(R2)      ;MOVE TO MAILBOX #  *******  103  *******
    004546  005242                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
    004550  000000                    HALT                    ;DATA RESULT OF NEGATE INCORRECT
    004552  105110            NEG12:  COMB    (R0)            ;LOC. 0=377
    004554  105410                    NEGB    (R0)            ;TRY NEGB LOC. 0=1
    004556  100403                    BMI     NEG13           ;CC=0001?
    004560  001402                    BEQ     NEG13
```

```
   887 004562  102401                      BVS     NEG13
   888 004564  103404                      BCS     NEG14
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                  ;           CONDITIONAL BRANCH INST. AND    <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                  ;           WHICH FOLLOWS W/ 746            <====
       004566                              NEG13:
       004566  012742  000104              MOV     #104,-(R2)     ;MOVE TO MAILBOX #  *******  104  *******
       004572  005242                      INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
       004574  000000                      HALT                   ;NEGB DID NOT SET CC'S CORRECTLY
   889 004576  005337  000000      NEG14:  DEC     @#0            ;TEST DATA RESULT
   890 004602  001404                      BEQ     TST56
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                  ;           CONDITIONAL BRANCH INST. AND    <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                  ;           WHICH FOLLOWS W/ 737            <====
       004604  012742  000105              MOV     #105,-(R2)     ;MOVE TO MAILBOX #  *******  105  *******
       004610  005242                      INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
       004612  000000                      HALT                   ;DATA RESULT OF NEGB INCORRECT
                                                                  ;  OR SEQUENCE ERROR
   891                             ;*****************************************************************************************
                                   ;TEST 56         TEST MODE 2 USING NEGATE INSTRUCTION
                                   ;*****************************************************************************************
       004614  005212                  TST56:  INC     (R2)           ;UPDATE TEST NUMBER
       004616  022712  000056              CMP     #56,(R2)       ;SEQUENCE ERROR?
       004622  001032                      BNE     TST57-10       ;BR TO ERROR HALT ON SEQ ERROR
   892 004624  005000                      CLR     R0             ;POINT TO LOC. 0
   893 004626  005010                      CLR     (R0)           ;CLEAR LOC. 0
   894 004630  005210                      INC     (R0)           ;LOC. 0=1
   895 004632  005420                      NEG     (R0)+          ;TRY NEG.: LOC. 0=-1
   896 004634  100003                      BPL     NEG20          ;CC=1001?
   897 004636  001402                      BEQ     NEG20
   898 004640  102401                      BVS     NEG20
   899 004642  103404                      BCS     NEG21
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                  ;           CONDITIONAL BRANCH INST. AND    <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                  ;           WHICH FOLLOWS W/ 767            <====
       004644                              NEG20:
       004644  012742  000106              MOV     #106,-(R2)     ;MOVE TO MAILBOX #  *******  106  *******
       004650  005242                      INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
       004652  000000                      HALT                   ;NEGATE DID NOT SET CC'S CORRECTLY
   900 004654  105300              NEG21:  DECB    R0             ;R0=LOC. 0
   901 004656  105300                      DECB    R0
   902 004660  105420                      NEGB    (R0)+          ;BYTE 0=1    R0=1
   903 004662  105420                      NEGB    (R0)+          ;BYTE 1=1    R0=2
   904 004664  105340                      DECB    -(R0)          ;R0=1  LOC. 0=01
   905 004666  005300                      DEC     R0             ;R0=0
   906 004670  001404                      BEQ     NEG22
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                  ;           CONDITIONAL BRANCH INST. AND    <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                  ;           WHICH FOLLOWS W/ 754            <====
       004672  012742  000107              MOV     #107,-(R2)     ;MOVE TO MAILBOX #  *******  107  *******
       004676  005242                      INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
       004700  000000                      HALT                   ;REGISTER NOT INCREMENTED CORRECTLY
   907 004702  005337  000000      NEG22:  DEC     @#0            ;LOC. 0=0
```

```
004706  001404                          BEQ     TST57
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 745             <====
004710  012742  000110                  MOV     #110,-(R2)      ;MOVE TO MAILBOX #  *******  110  *******
004714  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
004716  000000                          HALT                    ;NEG BYTE INSTRUCTIONS FAILED
                                                                ;  OR SEQUENCE ERROR

                                ;*******************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 3 SINGLE OPERAND INSTRUCTIONS.  IT
                                ;USES LOCATION 0 AS ITS TARGET DATA.  A TABLE LOCATED AT LOC. 400
                                ;THRU 402 IS USED TO SUPPLY THE ADDRESS OF LOCATION 0 TO THE
                                ;INSTRUCTIONS UNDER TEST.
                                ;       R0 IS SET TO 400, THE START OF THE ADDRESS TABLE, AND A CLR
                                ;INSTRUCTION IS EXECUTED WITH MODE 3 TO CLEAR LOC. 0.  THEN R0
                                ;IS DECREMENTED BY TWO AND TWO OTHER MODE 3 INSTRUCTIONS OPERATE ON
                                ;LOC. 0 TO VERIFY THE DATA RESULTS OF THE TEST.  THE PROPER INCREMENTING
                                ;OF THE REGISTER IS ALSO VERIFIED IN THIS MANNER.
                                ;       IF A FAILURE IS DETECTED BE SURE TO VERIFY THAT THE TABLE
                                ;(LOC. 400-402) HAS THE PROPER VALUES (0).
                                ;
                                ;*******************************************************************************
                                ;TEST 57        TEST MODE 3 USING SOP INST.
                                ;*******************************************************************************
004720  005212                  TST57:  INC     (R2)            ;UPDATE TEST NUMBER
004722  022712  000057                  CMP     #57,(R2)        ;SEQUENCE ERROR?
004726  001020                          BNE     TST60-10        ;BR TO ERROR HALT ON SEQ ERROR
004730  005000                          CLR     R0              ;SET R0=400
004732  105100                          COMB    R0
004734  005200                          INC     R0
004736  005010                          CLR     (R0)            ;CLEAR LOC 400
004740  005030                          CLR     @(R0)+          ;TRY TO CLEAR LOC 0 USING MODE 3 ;R0=402
004742  001404                          BEQ     SOP3A
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 771             <====
004744  012742  000111                  MOV     #111,-(R2)      ;MOVE TO MAILBOX #  *******  111  *******
004750  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
004752  000000                          HALT                    ;CLR DID NOT SET Z-BIT
004754  005300                  SOP3A:  DEC     R0              ;RESET R0=400
004756  005300                          DEC     R0
004760  005130                          COM     @(R0)+          ;TRY TO COMPLEMENT LOC 0 OF MODE 3  ;R0=402
004762  100002                          BPL     SOP3B
004764  005230                          INC     @(R0)+          ;TRY TO INCREMENT LOC 0 W/MODE 3  ;R0=404
004766  001404                          BEQ     TST60
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 757             <====
004770                          SOP3B:
004770  012742  000112                  MOV     #112,-(R2)      ;MOVE TO MAILBOX #  *******  112  *******
004774  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
004776  000000                          HALT                    ;CUMMULATIVE RESULT OF ABOVE INST FAILED
```

```
                                                                   ;  OR SEQUENCE ERROR

                                  ;*****************************************************************************
                                  ;
                                  ;       THIS TEST VERIFIES MODE 3 SINGLE OPERAND BYTE INSTRUCTIONS
                                  ;WHICH ADDRESS EVEN BYTES.  AGAIN, THE TARGET LOCATION 0 IS USED
                                  ;AND THE SAME TABLE AT 400 IS EMPLOYED.
                                  ;       AFTER POINTING R4 TO THE TABLE (400) AND SETTING LOCATION
                                  ;0 TO -1, A CLRB INSTRUCTION IS USED TO CLEAR BYTE 0.
                                  ;       SEVERAL OTHER MODE 3 INSTRUCTIONS ARE THEN USED WITH THE TABLE
                                  ;TO VERIFY THE DATA RESULTS AND THE PROPER INCREMENTING OF THE REGISTER.
                                  ;IF A FAILURE IS DETECTED, BE SURE THAT THE TABLE (LOCATION 400-402) HAS
                                  ;THE PROPER VALUES (0).
                                  ;
                                  ;*****************************************************************************
                                  ;TEST 60        TEST MODE 3 EVEN BYTE USING SOP INST.
                                  ;*****************************************************************************
     005000  005212               TST60:  INC     (R2)               ;UPDATE TEST NUMBER
     005002  022712  000060               CMP     #60,(R2)           ;SEQUENCE ERROR?
     005006  001026                       BNE     TST61-10           ;BR TO ERROR HALT ON SEQ ERROR
     005010  005004                       CLR     R4                 ;SET R4=400
     005012  105104                       COMB    R4
     005014  005204                       INC     R4
     005016  005000                       CLR     R0                 ;INITIALIZE LOC. 0=-1
     005020  005010                       CLR     (R0)
     005022  005110                       COM     (R0)               ;LOC. 0=-1
     005024  105034                       CLRB    @(R4)+             ;TRY TO CLEAR EVEN BYTE ;LOC. 0=177400  R4=402
     005026  001404                       BEQ     SOPB3A
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                     ;           WHICH FOLLOWS W/ 767           <====
     005030  012742  000113               MOV     #113,-(R2)         ;MOVE TO MAILBOX #  *******  113  *******
     005034  005242                       INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     005036  000000                       HALT                       ;CLRB DID NOT SET Z-BIT
     005040  005304               SOPB3A: DEC     R4                 ;RESET POINTER  R4=400
     005042  005304                       DEC     R4
     005044  005234                       INC     @(R4)+             ;TRY INCREMENTING WORD  LOC.0=177401  R4=402
     005046  100006                       BPL     SOPB3B
     005050  105434                       NEGB    @(R4)+             ;TRY TO NEGATE EVEN BYTE ;LOC.0=-1 R4=404
     005052  100004                       BPL     SOPB3B
     005054  005304                       DEC     R4                 ;R4=402
     005056  005304                       DEC     R4
     005060  105234                       INCB    @(R4)+             ;TRY TO INCREMENT EVEN BYTE ;LOC. 0=17400
     005062  001404                       BEQ     TST61
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                     ;           WHICH FOLLOWS W/ 751           <====
     005064                       SOPB3B:
     005064  012742  000114               MOV     #114,-(R2)         ;MOVE TO MAILBOX #  *******  114  *******
     005070  005242                       INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     005072  000000                       HALT                       ;CUMMULATIVE RESULT OF ABOVE INST FAILED
                                                                     ;  OR SEQUENCE ERROR

                                  ;*****************************************************************************
                                  ;
```

```
 972                                  ;       THIS TEST VERIFIES MODE 3 SINGLE OPERAND BYTE INSTRUCTIONS
 973                                  ;WHICH ADDRESS ODD BYTES.  THE TARGET IS BYTE 1.  A TABLE AT
 974                                  ;LOC. 400-406 IS USED.  R0 SERVES AS THE TABLE POINTER.
 975                                  ;       R0 IS INITIALIZED TO 400.  LOC. 0 IS SET TO -1 USING THE
 976                                  ;FIRST TWO TABLE ENTRIES.  A CLRB MODE 3 IS EXECUTED ON BYTE 1 USING
 977                                  ;TABLE ADDRESS AT 404.  R0 IS DECREMENTED TO 402 AND SEVERAL SOP
 978                                  ;MODE 3 INSTRUCTIONS ARE USED TO VERIFY DATA RESULTS AND PROPER
 979                                  ;REGISTER INCREMENTING.
 980                                  ;       THE TABLE (400-406) SHOULD CONTAIN 0,0,1,1 BEFORE AND
 981                                  ;AFTER THE TEST IS RUN.
 982                                  ;
 983                                  ;*******************************************************************************
                                      ;TEST 61        TEST MODE 3 ODD BYTE USING SOP INST.
                                      ;*******************************************************************************
     005074  005212                   TST61:  INC     (R2)            ;UPDATE TEST NUMBER
     005076  022712  000061                   CMP     #61,(R2)        ;SEQUENCE ERROR?
     005102  001024                           BNE     TST62-10        ;BR TO ERROR HALT ON SEQ ERROR
 984 005104  005000                           CLR     R0              ;SET R0=400
 985 005106  105100                           COMB    R0
 986 005110  005200                           INC     R0
 987 005112  005030                           CLR     @(R0)+          ;INITIALIZE
 988 005114  005130                           COM     @(R0)+          ;LOC 0=-1 R0=404
 989 005116  105030                           CLRB    @(R0)+          ;TRY TO CLEAR ODD BYTE LOC. 0=377 R0=406
 990 005120  001404                           BEQ     SOPB3C
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 770           <====
     005122  012742  000115                   MOV     #115,-(R2)      ;MOVE TO MAILBOX #  *******  115  *******
     005126  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     005130  000000                           HALT                    ;CLRB DID NOT SET Z-BIT
 991 005132  005300                   SOPB3C: DEC     R0              ;RESET R0=402
 992 005134  005300                           DEC     R0
 993 005136  005300                           DEC     R0              ;POINT TO EVEN BYTE ADDR.
 994 005140  005300                           DEC     R0
 995 005142  005230                           INC     @(R0)+          ;INCREMENT WORD LOC. 0=400 R0=404
 996 005144  105430                           NEGB    @(R0)+          ;TRY TO NEGATE ODD BYTE LOC. 0=177400 R0=406
 997 005146  100002                           BPL     SOPB3D
 998 005150  105230                           INCB    @(R0)+          ;TRY TO INCREMENT ODD BYTE LOC.0=0 R0=410
 999 005152  001404                           BEQ     TST62
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 753           <====
     005154                           SOPB3D:
     005154  012742  000116                   MOV     #116,-(R2)      ;MOVE TO MAILBOX #  *******  116  *******
     005160  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     005162  000000                           HALT                    ;CUMMULATIVE RESULT OF ABOVE INSTS FAILED
                                                                      ;  OR SEQUENCE ERROR
1000                                  ;*******************************************************************************
                                      ;TEST 62        TEST MODE 3 USING NEGATE INSTRUCTION
                                      ;*******************************************************************************
     005164  005212                   TST62:  INC     (R2)            ;UPDATE TEST NUMBER
     005166  022712  000062                   CMP     #62,(R2)        ;SEQUENCE ERROR?
     005172  001054                           BNE     TST63-10        ;BR TO ERROR HALT ON SEQ ERROR
1001 005174  005000                           CLR     R0              ;R0=400
1002 005176  105100                           COMB    R0
```

```
1003 005200  005200                           INC     R0
1004 005202  005010                           CLR     (R0)            ;LOC. 400=0
1005 005204  005004                           CLR     R4              ;R4=0
1006 005206  005014                           CLR     (R4)            ;LOC. 0=0
1007 005210  005214                           INC     (R4)            ;LOC. 0=1
1008 005212  005430                           NEG     @(R0)+          ;TRY NEGATE   LOC. 0=-1  R0=402
1009 005214  100003                           BPL     NEG30           ;CC=1001?
1010 005216  001402                           BEQ     NEG30
1011 005220  102401                           BVS     NEG30
1012 005222  103404                           BCS     NEG31
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 763            <====
     005224                           NEG30:
     005224  012742  000117                   MOV     #117,-(R2)      ;MOVE TO MAILBOX #  *******  117  *******
     005230  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     005232  000000                           HALT                    ;NEG DID NOT SET CC'S CORRECTLY
1013 005234  005214                   NEG31:  INC     (R4)            ;LOC. 0=0
1014 005236  001404                           BEQ     NEG32
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 755            <====
     005240  012742  000120                   MOV     #120,-(R2)      ;MOVE TO MAILBOX #  *******  120  *******
     005244  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     005246  000000                           HALT                    ;DATA RESULT OF NEG INCORRECT
1015 005250  105137  000001           NEG32:  COMB    @#1             ;LOC 0=177400
1016 005254  005237  000000                   INC     @#0             ;LOC. 0=177401
1017 005260  105430                           NEGB    @(R0)+          ;TRY NEGB LOC. 0=177777  R0=404
1018 005262  100404                           BMI     NEG33
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 743            <====
     005264  012742  000121                   MOV     #121,-(R2)      ;MOVE TO MAILBOX #  *******  121  *******
     005270  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     005272  000000                           HALT                    ;NEGB FAILED WITH EVEN BYTE
1019 005274  105430                   NEG33:  NEGB    @(R0)+          ;TRY NEGB  LOC.0=777  R0=406
1020 005276  100004                           BPL     NEG34
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 735            <====
     005300  012742  000122                   MOV     #122,-(R2)      ;MOVE TO MAILBOX #  *******  122  *******
     005304  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     005306  000000                           HALT                    ;NEGB FAILED WITH ODD BYTE
1021 005310  105137  000001           NEG34:  COMB    @#1             ;LOC. 0=177377
1022 005314  105237  000001                   INCB    @#1             ;LOC. 0=177777
1023 005320  005214                           INC     (R4)            ;LOC. 0=0
1024 005322  001404                           BEQ     TST63
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 723            <====
     005324  012742  000123                   MOV     #123,-(R2)      ;MOVE TO MAILBOX #  *******  123  *******
     005330  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
```

```
005332  000000                          HALT                    ;DATA RESULT OF NEGB'S INCORRECT
                                                                ;  OR SEQUENCE ERROR


                                ;*******************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 4 SINGLE OPERAND INSTRUCTIONS.
                                ;RO IS SET TO 400. A CLR INSTRUCTION IS EXECUTED IN MODE 4 TO CLEAR
                                ;LOC. 376. RO IS RESET TO 400 AND A COM INSTRUCTION USING MODE 4
                                ;COMPLEMENTS LOC.376.
                                ;       TWO INC INSTRUCTIONS AND A MODE 4 INSTRUCTION ARE EXECUTED
                                ;TO COMPLETE THE TEST.
                                ;*******************************************************************************
                                ;TEST 63        TEST MODE 4 USING SOP INSTS
                                ;*******************************************************************************
005334  005212                  TST63:  INC     (R2)            ;UPDATE TEST NUMBER
005336  022712  000063                  CMP     #63,(R2)        ;SEQUENCE ERROR?
005342  001021                          BNE     TST64-10        ;BR TO ERROR HALT ON SEQ ERROR
005344  005000                          CLR     R0              ;SET R0=400
005346  105100                          COMB    R0
005350  005200                          INC     R0
005352  005040                          CLR     -(R0)           ;TRY TO CLEAR USING MODE 4
005354  001404                          BEQ     SOP4A
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                ;           CONDITIONAL BRANCH INST. AND      <====
                                                                ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                ;           WHICH FOLLOWS W/ 772              <====
005356  012742  000124                  MOV     #124,-(R2)      ;MOVE TO MAILBOX #  *******  124  *******
005362  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
005364  000000                          HALT                    ;CLR DID NOT SET Z-BIT
005366  005200                  SOP4A:  INC     R0              ;RESET R0
005370  005200                          INC     R0
005372  005140                          COM     -(R0)           ;TRY TO COMPLEMENT USING MODE 4
005374  100004                          BPL     SOP4B
005376  005200                          INC     R0              ;MOVE POINTER
005400  005200                          INC     R0
005402  005240                          INC     -(R0)
005404  001404                          BEQ     TST64
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                ;           CONDITIONAL BRANCH INST. AND      <====
                                                                ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                ;           WHICH FOLLOWS W/ 756              <====
005406                          SOP4B:
005406  012742  000125                  MOV     #125,-(R2)      ;MOVE TO MAILBOX #  *******  125  *******
005412  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
005414  000000                          HALT                    ;CHECK CUMMULATIVE RESULT OF ABOVE INST.
                                                                ;  OR SEQUENCE ERROR

                                ;*******************************************************************************
                                ;
                                ;
                                ;       THIS TEST VERIFIES MODE 5 SINGLE OPERAND INSTRUCTIONS.  IT
                                ;USES LOCATION 0 AS ITS TARGET DATA.  A TABLE LOCATED AT LOC. 372
                                ;THRU 374 IS USED TO SUPPLY THE ADDRESS OF LOCATION 0 TO THE
                                ;INSTRUCTIONS UNDER TEST.
                                ;       RO IS SET TO 376, (THE START OF THE ADDRESS TABLE) +2,
                                ;AND A CLR INSTRUCTION IS EXECUTED WITH MODE 3 TO CLEAR
                                ;LOC. 0.  THEN RO IS INCREMENTED BY TWO AND TWO OTHER MODE 3
                                ;INSTRUCTIONS OPERATE ON LOC. 0 TO VERIFY THE DATA RESULTS OF
```

```
                                  ;THE TEST.  THE PROPER DECREMENTING OF THE REGISTER IS ALSO
                                  ;VERIFIED IN THIS MANNER.
                                  ;         IF A FAILURE IS DETECTED BE SURE TO VERIFY THAT THE TABLE
                                  ;(LOC. 372 THRU 374) HAS THE PROPER VALUES (0).
                                  ;
                                  ;*******************************************************************************
                                  ;TEST 64         TEST MODE 5 USING SOP INSTS
                                  ;*******************************************************************************
005416  005212                    TST64:  INC     (R2)            ;UPDATE TEST NUMBER
005420  022712  000064                    CMP     #64,(R2)        ;SEQUENCE ERROR?
005424  001017                            BNE     TST65-10        ;BR TO ERROR HALT ON SEQ ERROR
005426  005000                            CLR     R0              ;SET R0=376
005430  005020                            CLR     (R0)+
005432  105400                            NEGB    R0
005434  005050                            CLR     @-(R0)          ;TRY TO CLEAR LOC 0 W/MODE 5
005436  001404                            BEQ     SOP5A
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                  ;           CONDITIONAL BRANCH INST. AND   <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                  ;           WHICH FOLLOWS W/ 772           <====
005440  012742  000126                    MOV     #126,-(R2)      ;MOVE TO MAILBOX #  *******  126  *******
005444  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
005446  000000                            HALT                    ;CLR DID NOT SET Z-BIT
005450  005200                    SOP5A:  INC     R0              ;RESET R0
005452  005200                            INC     R0
005454  005150                            COM     @-(R0)          ;TRY TO COMPLEMENT LOC. 0 W/MODE 5
005456  100002                            BPL     SOP5B
005460  005250                            INC     @-(R0)          ;TRY TO INCREMENT LOC. 0 W/MODE 5
005462  001404                            BEQ     TST65
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                  ;           CONDITIONAL BRANCH INST. AND   <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                  ;           WHICH FOLLOWS W/ 760           <====
005464                            SOP5B:
005464  012742  000127                    MOV     #127,-(R2)      ;MOVE TO MAILBOX #  *******  127  *******
005470  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
005472  000000                            HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE INSTS
                                                                  ;  OR SEQUENCE ERROR

                                  ;*******************************************************************************
                                  ;
                                  ;         THIS TEST VERIFIES MODE 6 SINGLE OPERAND INSTRUCTIONS.  IT
                                  ;USES LOCATION 0 AS ITS TARGET DATA.  R0 IS SET TO 400 USING
                                  ;PREVIOUSLY TESTED INSTRUCTIONS AND A MODE 6 CLR INSTRUCTION IS
                                  ;EXECUTED ON LOC. 0 USING R0 AND A -400 OFFSET.  COM AND INC
                                  ;INSTRUCTIONS ARE THEN USED TO VERIFY THE DATA.
                                  ;
                                  ;*******************************************************************************
                                  ;TEST 65         TEST MODE 6 USING SOP INSTS
                                  ;*******************************************************************************
005474  005212                    TST65:  INC     (R2)            ;UPDATE TEST NUMBER
005476  022712  000065                    CMP     #65,(R2)        ;SEQUENCE ERROR?
005502  001020                            BNE     TST66-10        ;BR TO ERROR HALT ON SEQ ERROR
005504  005000                            CLR     R0              ;SET R0=400
005506  105100                            COMB    R0
005510  005200                            INC     R0
005512  005060  177400                    CLR     -400(R0)        ;TRY TO CLEAR LOCATION 0 W/MODE 6
```

```
 1090 005516  001404                      BEQ     SOP6A
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 771             <====
      005520  012742  000130              MOV     #130,-(R2)    ;MOVE TO MAILBOX #  *******  130   *******
      005524  005242                      INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
      005526  000000                      HALT                  ;CLR DID NOT SET Z-BIT
 1091 005530  005160  177400     SOP6A:   COM     -400(R0)      ;TRY TO COMPLEMENT LOCATION 0 W/MODE 6
 1092 005534  100003                      BPL     SOP6B
 1093 005536  005260  177400              INC     -400(R0)      ;TRY TO INCREMENT LOCATION 0 W/MODE 6
 1094 005542  001404                      BEQ     TST66
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 757             <====
      005544                             SOP6B:
      005544  012742  000131              MOV     #131,-(R2)    ;MOVE TO MAILBOX #  *******  131   *******
      005550  005242                      INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
      005552  000000                      HALT                  ;TEST CUMMULATIVE RESULT OF ABOVE INSTS
                                                                ;  OR SEQUENCE ERROR
 1095
 1096                                    ;*******************************************************************************
 1097                                    ;
 1098                                    ;       THIS TEST VERIFIES MODE 7 SINGLE OPERAND INSTRUCTIONS.  IT USES
 1099                                    ;THE POINTER TO LOC. 0 WHICH IS STORED AT LOC. 402.
 1100                                    ;       R0 IS SET TO 400 AND A MODE 7 CLR INSTRUCTION IS
 1101                                    ;EXECUTED WITH A +2 OFFSET TO CLEAR LOC. 0.
 1102                                    ;       SEVERAL OTHER MODE 7 INSTRUCTIONS ARE THEN USED ON THE COMMON
 1103                                    ;LOCATION TO VERIFY THE DATA RESULTS.
 1104                                    ;
 1105                                    ;*******************************************************************************
                                         ;TEST 66         TEST MODE 7 USING SOP INST.
                                         ;*******************************************************************************
      005554  005212                     TST66:   INC     (R2)          ;UPDATE TEST NUMBER
      005556  022712  000066              CMP     #66,(R2)      ;SEQUENCE ERROR?
      005562  001021                      BNE     TST67-10      ;BR TO ERROR HALT ON SEQ ERROR
 1106 005564  005000                      CLR     R0            ;SET R0=400
 1107 005566  105100                      COMB    R0
 1108 005570  005200                      INC     R0
 1109 005572  005210                      INC     (R0)          ;R0=1
 1110 005574  005070  000002              CLR     @2(R0)        ;TRY TO CLEAR LOC. 0 W/MODE 7
 1111 005600  001404                      BEQ     SOP7A
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 770             <====
      005602  012742  000132              MOV     #132,-(R2)    ;MOVE TO MAILBOX #  *******  132   *******
      005606  005242                      INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
      005610  000000                      HALT                  ;CLR DID NOT SET Z-BIT
 1112 005612  005170  000002     SOP7A:   COM     @2(R0)        ;TRY TO COMPLEMENT LOC. 0 W/MODE 7
 1113 005616  100003                      BPL     SOP7B
 1114 005620  005270  000002              INC     @2(R0)        ;TRY TO INCREMENT LOC. 0 W/MODE 7
 1115 005624  001404                      BEQ     TST67
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                      ;                 WHICH FOLLOWS W/ 756           <====
      005626                                    SOP7B:
      005626  012742  000133                            MOV     #133,-(R2)      ;MOVE TO MAILBOX #  *******  133  *******
      005632  005242                                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      005634  000000                                    HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE INSTS.
                                                                                ;  OR SEQUENCE ERROR
 1116
 1117                                           ;*******************************************************************************
                                                ;TEST 67        TEST MODE 4 WITH NEGATE INSTRUCTION
                                                ;*******************************************************************************
      005636  005212                            TST67:  INC     (R2)            ;UPDATE TEST NUMBER
      005640  022712  000067                            CMP     #67,(R2)        ;SEQUENCE ERROR?
      005644  001024                                    BNE     TST70-10        ;BR TO ERROR HALT ON SEQ ERROR
 1118 005646  005000                                    CLR     R0
 1119 005650  005010                                    CLR     (R0)
 1120 005652  005120                                    COM     (R0)+           ;LOC. 0=177777,  R0=2
 1121 005654  005440                                    NEG     -(R0)           ;TRY NEGATE, LOC. 0=1
 1122 005656  100403                                    BMI     NEG40           ;CC=0001?
 1123 005660  001402                                    BEQ     NEG40
 1124 005662  102401                                    BVS     NEG40
 1125 005664  103404                                    BCS     NEG41
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                                ;           WHICH FOLLOWS W/ 767             <====
      005666                                    NEG40:
      005666  012742  000134                            MOV     #134,-(R2)      ;MOVE TO MAILBOX #  *******  134  *******
      005672  005242                                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      005674  000000                                    HALT                    ;NEG DID NOT SET CC'S CORRECTLY
 1126 005676  005400                            NEG41:  NEG     R0              ;TST R0 WITH A NEG.
 1127 005700  001404                                    BEQ     NEG42
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                                ;           WHICH FOLLOWS W/ 761             <====
      005702  012742  000135                            MOV     #135,-(R2)      ;MOVE TO MAILBOX #  *******  135  *******
      005706  005242                                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      005710  000000                                    HALT                    ;R0 NOT DECREMENTED PROPERLY
 1128 005712  005310                            NEG42:  DEC     (R0)            ;TEST DTA RESULT OF NEG
 1129 005714  001404                                    BEQ     TST70
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                                ;           WHICH FOLLOWS W/ 753             <====
      005716  012742  000136                            MOV     #136,-(R2)      ;MOVE TO MAILBOX #  *******  136  *******
      005722  005242                                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      005724  000000                                    HALT                    ;DATA RESULT OF NEG INCORRECT
                                                                                ;  OR SEQUENCE ERROR
 1130                                           ;*******************************************************************************
                                                ;TEST 70        TEST MODE 5 WITH NEGATE INSTRUCTION
                                                ;*******************************************************************************
      005726  005212                            TST70:  INC     (R2)            ;UPDATE TEST NUMBER
      005730  022712  000070                            CMP     #70,(R2)        ;SEQUENCE ERROR?
      005734  001031                                    BNE     TST71-10        ;BR TO ERROR HALT ON SEQ ERROR
 1131 005736  005000                                    CLR     R0              ;R0=0
 1132 005740  005010                                    CLR     (R0)            ;LOC. 0=0
 1133 005742  105100                                    COMB    R0              ;R0=377
```

```
     005744  005200                         INC     R0              ;R0=400
     005746  005010                         CLR     (R0)            ;SET 400 = 0
     005750  005004                         CLR     R4              ;R4=0
     005752  005314                         DEC     (R4)            ;LOC. 0=177777
     005754  005450                         NEG     @-(R0)          ;TRY NEGATE:  LOC. 0=1
     005756  100403                         BMI     NEG50           ;CC=0001?
     005760  001402                         BEQ     NEG50
     005762  102401                         BVS     NEG50
     005764  103404                         BCS     NEG51
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 763             <====
     005766                         NEG50:
     005766  012742  000137                 MOV     #137,-(R2)      ;MOVE TO MAILBOX #  *******  137  *******
     005772  005242                         INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     005774  000000                         HALT                    ;NEG DID NOT SET CC'S CORRECTLY
     005776  005314                 NEG51:  DEC     (R4)
     006000  001404                         BEQ     NEG52
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 755             <====
     006002  012742  000140                 MOV     #140,-(R2)      ;MOVE TO MAILBOX #  *******  140  *******
     006006  005242                         INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     006010  000000                         HALT                    ;DATA RESULT OF NEG INCORRECT
     006012  105100                 NEG52:  COMB    R0
     006014  005300                         DEC     R0
     006016  001404                         BEQ     TST71
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 746             <====
     006020  012742  000141                 MOV     #141,-(R2)      ;MOVE TO MAILBOX #  *******  141  *******
     006024  005242                         INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     006026  000000                         HALT                    ;REGISTER NOT DECREMENTED PROPERLY
                                                                    ;  OR SEQUENCE ERROR
                                    ;*******************************************************************************
                                    ;TEST 71          TEST MODE 6 WITH NEGATE
                                    ;*******************************************************************************
     006030  005212                 TST71:  INC     (R2)            ;UPDATE TEST NUMBER
     006032  022712  000071                 CMP     #71,(R2)        ;SEQUENCE ERROR?
     006036  001022                         BNE     TST72-10        ;BR TO ERROR HALT ON SEQ ERROR
     006040  005000                         CLR     R0              ;R0=0
     006042  005004                         CLR     R4              ;R4=0
     006044  105100                         COMB    R0              ;R0=377
     006046  005014                         CLR     (R4)            ;LOC. 0=0
     006050  105024                         CLRB    (R4)+           ;LOC. 0=177777,  R4=1
     006052  105114                         COMB    (R4)            ;LOC. 0=177400
     006054  005460  177401                 NEG     -377(R0)        ;LOC. 0=400
     006060  100403                         BMI     NEG60           ;CC=0001
     006062  001402                         BEQ     NEG60
     006064  102401                         BVS     NEG60
     006066  103404                         BCS     NEG61
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                           ;            WHICH FOLLOWS W/ 763        <====
     006070                              NEG60:
     006070  012742  000142                      MOV     #142,-(R2)     ;MOVE TO MAILBOX #  *******  142  *******
     006074  005242                              INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     006076  000000                              HALT                   ;NEG DID NOT SET CC'S CORRECTLY
1160 006100  105314                      NEG61:  DECB    (R4)
1161 006102  001404                              BEQ     TST72
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 755            <====
     006104  012742  000143                      MOV     #143,-(R2)     ;MOVE TO MAILBOX #  *******  143  *******
     006110  005242                              INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     006112  000000                              HALT                   ;DATA RESULT OF NEG INCORRECT
                                                                        ;  OR SEQUENCE ERROR
1162                                     ;*******************************************************************************
                                         ;TEST 72          TEST MODE 7 W/ NEGATE
                                         ;*******************************************************************************
     006114  005212                      TST72:  INC     (R2)           ;UPDATE TEST NUMBER
     006116  022712  000072                      CMP     #72,(R2)       ;SEQUENCE ERROR?
     006122  001024                              BNE     TST73-10       ;BR TO ERROR HALT ON SEQ ERROR
1163 006124  005000                              CLR     R0             ;R0=0
1164 006126  005010                              CLR     (R0)           ;LOC. 0=0
1165 006130  005110                              COM     (R0)           ;LOC. 0=177777
1166 006132  105100                              COMB    R0             ;R0=377
1167 006134  105470  000005                      NEGB    @5(R0)         ;R0+5=404,  404=1,  LOC. 0=777
1168 006140  100403                              BMI     NEG70          ;CC=0001?
1169 006142  001402                              BEQ     NEG70
1170 006144  102401                              BVS     NEG70
1171 006146  103404                              BCS     NEG71
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 765            <====
     006150                              NEG70:
     006150  012742  000144                      MOV     #144,-(R2)     ;MOVE TO MAILBOX #  *******  144  *******
     006154  005242                              INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     006156  000000                              HALT                   ;NEG DID NOT SET CC'S CORRECTLY
1172 006160  105100                      NEG71:  COMB    R0             ;R0=0
1173 006162  105120                              COMB    (R0)+          ;LOC. 0=400,  R0=1
1174 006164  105310                              DECB    (R0)           ;LOC. 0=0
1175 006166  005467  171606                      NEG     0              ;USE NEG MODE 67 TO TST FOR ZERO
1176 006172  001404                              BEQ     TST73
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 753            <====
     006174  012742  000145                      MOV     #145,-(R2)     ;MOVE TO MAILBOX #  *******  145  *******
     006200  005242                              INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     006202  000000                              HALT                   ;DATA RESULT OF NEG WAS INCORRECT
                                                                        ;  OR SEQUENCE ERROR
1177
1178                                     ;*******************************************************************************
1179                                     ;
1180                                     ;        THIS TEST VERIFIES PROGRAM COUNTER ADDRESSING WITH SOP
1181                                     ;INSTRUCTIONS.  CLR MODE 77 IS USED TO CLEAR THE LOCATION FOLLOWING THE
1182                                     ;INSTRUCTION (SOPX).  THEN SINGLE OPERAND INSTRUCTIONS WITH MODES 37, 67, AND
```

```
                        ;77, USING INDIRECT POINTER SOPXAD ARE USED TO VERIFY THE DATA RESULTS
                        ;OF THESE INSTRUCTIONS.
                        ;
                        ;*************************************************************************************
                        ;TEST 73        TEST SOP OPCODE MODES 2,3,6,7 WITH P.C.
                        ;*************************************************************************************
006204  005212          TST73:  INC     (R2)            ;UPDATE TEST NUMBER
006206  022712  000073          CMP     #73,(R2)        ;SEQUENCE ERROR?
006212  001017                  BNE     SOPB            ;BR TO ERROR HALT ON SEQ ERROR
006214  005027                  CLR     (R7)+           ;CLEAR NEXT LOCATION: (SOPX)
006216  177777          SOPX:   -1                      ;USE MODE 27
006220  001404                  BEQ     SOPA
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS        <====
                                                        ;           CONDITIONAL BRANCH INST. AND        <====
                                                        ;           REPLACE THE MOVE INSTRUCTION        <====
                                                        ;           WHICH FOLLOWS W/ 774                <====
006222  012742  000146          MOV     #146,-(R2)      ;MOVE TO MAILBOX #  *******  146  *******
006226  005242                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
006230  000000                  HALT                    ;CLR DID NOT SET Z-BIT
006232  005237  006216  SOPA:   INC     @#SOPX          ;INC SOPX W/MODE 37
006236  005467  177754          NEG     SOPX            ;NEGATE SOPX W/MODE 67
006242  100003                  BPL     SOPB
006244  005277  000012          INC     @SOPXAD         ;INC SOPX W/MODE 77
006250  001405                  BEQ     TST74
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS        <====
                                                        ;           CONDITIONAL BRANCH INST. AND        <====
                                                        ;           REPLACE THE MOVE INSTRUCTION        <====
                                                        ;           WHICH FOLLOWS W/ 760                <====
006252                  SOPB:
006252  012742  000147          MOV     #147,-(R2)      ;MOVE TO MAILBOX #  *******  147  *******
006256  005242                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
006260  000000                  HALT                    ;INC DID NOT SET Z-BIT
                                                        ;  OR SEQUENCE ERROR
006262  006216          SOPXAD: SOPX                    ;INDIRECT ADDRESS OF SOPX

                        ;*************************************************************************************
                        ;
                        ;       THIS TEST VERIFIES SINGLE OPERAND NON-MODIFYING INSTRUCTIONS
                        ;USING MODE 0.  R0 IS SET TO ZERO AND THE CONDITION CODES ARE SET
                        ;TO THE COMPLEMENT OF THAT EXPECTED BY THE INSTRUCTION.  A TST INSTRUCTION
                        ;IS EXECUTED AND CONDITIONAL BRANCHES ARE USED TO TEST THE CONDITION
                        ;CODES.
                        ;
                        ;*************************************************************************************
                        ;TEST 74        TEST MODE 0 SOP NON-MODIFYING
                        ;*************************************************************************************
006264  005212          TST74:  INC     (R2)            ;UPDATE TEST NUMBER
006266  022712  000074          CMP     #74,(R2)        ;SEQUENCE ERROR?
006272  001010                  BNE     TST75-10        ;BR TO ERROR HALT ON SEQ ERROR
006274  005000                  CLR     R0              ;INITIALIZE R0=0
006276  000277                  SCC                     ;SET CC=1011
006300  000244                  CLZ
006302  005700                  TST     R0              ;TRY TST W/ MODE 0
006304  102403                  BVS     SNM0A           ;CHECK THAT CC=0100
006306  100402                  BMI     SNM0A
006310  103401                  BCS     SNM0A
006312  001404                  BEQ     TST75
```

```
                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                          ;           CONDITIONAL BRANCH INST. AND    <====
                                                          ;           REPLACE THE MOVE INSTRUCTION    <====
                                                          ;           WHICH FOLLOWS W/ 767            <====
 006314                          SNM0A:
 006314  012742  000150                  MOV     #150,-(R2)       ;MOVE TO MAILBOX #  *******  150  *******
 006320  005242                          INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
 006322  000000                          HALT                     ;CONDITION CODES NOT SET PROPERLY
                                                                  ;  OR SEQUENCE ERROR

                                 ;*******************************************************************************
                                 ;
                                 ;         THIS TEST VERIFIES SINGLE OPERAND NON-MODIFYING BYTE INSTRUCTIONS WITH MODE 0.
                                 ;R0 IS SET TO 377 AND COMPLEMENT OF THE EXPECTED CONDITION CODES
                                 ;IS LOADED IN PSW.  A TSTB INSTRUCTION IS EXECUTED AND THE RESULTS
                                 ;ARE CHECKED WITH SEVERAL CONDITIONAL BRANCH INSTRUCTIONS.
                                 ;         THIS VERIFIES THAT THE PROPER BYTE WAS TESTED.
                                 ;
                                 ;*******************************************************************************
                                 ;TEST 75          TEST MODE 0 EVEN BYTE W/ SOP NON-MODIFYING
                                 ;*******************************************************************************
 006324  005212                  TST75:  INC     (R2)             ;UPDATE TEST NUMBER
 006326  022712  000075                  CMP     #75,(R2)         ;SEQUENCE ERROR?
 006332  001010                          BNE     TST76-10         ;BR TO ERROR HALT ON SEQ ERROR
 006334  005000                          CLR     R0               ;INITIALIZE
 006336  105100                          COMB    R0               ;R0=377
 006340  000277                          SCC                      ;SET CC=0111
 006342  000250                          CLN
 006344  105700                          TSTB    R0               ;TRY TST EVEN BYTE
 006346  102402                          BVS     SNMB0A           ;CHECK CC=1000
 006350  101401                          BLOS    SNMB0A
 006352  100404                          BMI     TST76
                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                          ;           CONDITIONAL BRANCH INST. AND    <====
                                                          ;           REPLACE THE MOVE INSTRUCTION    <====
                                                          ;           WHICH FOLLOWS W/ 767            <====
 006354                          SNMB0A:
 006354  012742  000151                  MOV     #151,-(R2)       ;MOVE TO MAILBOX #  *******  151  *******
 006360  005242                          INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
 006362  000000                          HALT                     ;CONDITION CODES NOT SET PROPERLY
                                                                  ;  OR SEQUENCE ERROR

                                 ;*******************************************************************************
                                 ;
                                 ;         THIS TEST VERIFIES SINGLE OPERAND INSTRUCTIONS WITH MODE 1.
                                 ;R0 IS USED TO POINT TO AND CLEAR LOC. 0.  THE COMPLEMENT OF THE
                                 ;EXPECTED CONDITION CODES ARE LOADED IN THE PSW.  A TST INSTRUCTION
                                 ;IS THEN EXECUTED ON LOC. 0 USING R0 AND CONDITIONAL BRANCHES TEST
                                 ;THE RESULTS.
                                 ;
                                 ;*******************************************************************************
                                 ;TEST 76          TEST MODE 1 SOP NON-MODIFYING
                                 ;*******************************************************************************
 006364  005212                  TST76:  INC     (R2)             ;UPDATE TEST NUMBER
 006366  022712  000076                  CMP     #76,(R2)         ;SEQUENCE ERROR?
 006372  001011                          BNE     TST77-10         ;BR TO ERROR HALT ON SEQ ERROR
 006374  005000                          CLR     R0               ;POINT TO LOC 0
```

```
006376  005010                  CLR     (R0)            ;CLEAR LOC 0
006400  000277                  SCC                     ;INITIALIZE
006402  000244                  CLZ                     ;CC=1011
006404  005710                  TST     (R0)            ;TRY TST W/ MODE 1
006406  102403                  BVS     SNM1A           ;CHECK CC=0100
006410  103402                  BCS     SNM1A
006412  100401                  BMI     SNM1A
006414  001404                  BEQ     TST77
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                        ;           WHICH FOLLOWS W/ 766            <====
006416                          SNM1A:
006416  012742  000152          MOV     #152,-(R2)      ;MOVE TO MAILBOX #  *******  152  *******
006422  005242                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
006424  000000                  HALT                    ;CC'S NOT SET PROPERLY
                                                        ;  OR SEQUENCE ERROR

                        ;*******************************************************************************
                        ;
                        ;       THIS TEST SETS LOCATION 0 TO 377 AND THEN USES R0 TO TEST
                        ;THE EVEN BYTE AND THE ODD BYTE USING SOP BYTE INSTRUCTIONS WITH MODE 1.
                        ;AGAIN, CONDITIONAL BRANCHES ARE USED TO VERIFY THE SETTING OF THE
                        ;PROPER CONDITION CODE BITS.
                        ;
                        ;*******************************************************************************
                        ;TEST 77        TEST MODE 1 BYTE INST. NON-MODIFYING
                        ;*******************************************************************************
006426  005212          TST77:  INC     (R2)            ;UPDATE TEST NUMBER
006430  022712  000077          CMP     #77,(R2)        ;SEQUENCE ERROR?
006434  001026                  BNE     TST100-10       ;BR TO ERROR HALT ON SEQ ERROR
006436  005000                  CLR     R0              ;POINT TO LOC 0
006440  005010                  CLR     (R0)            ;CLEAR LOC 0
006442  105110                  COMB    (R0)            ;COMPLEMENT BYTE 0
006444  000277                  SCC                     ;SET CC=0111
006446  000250                  CLN
006450  105710                  TSTB    (R0)            ;TRY TST ON EVEN BYTE
006452  102402                  BVS     SNMB1A
006454  101401                  BLOS    SNMB1A
006456  100404                  BMI     SNMB1B
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                        ;           WHICH FOLLOWS W/ 766            <====
006460                  SNMB1A:
006460  012742  000153          MOV     #153,-(R2)      ;MOVE TO MAILBOX #  *******  153  *******
006464  005242                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
006466  000000                  HALT                    ;CC'S NOT CORRECT
006470  005000          SNMB1B: CLR     R0
006472  005200                  INC     R0
006474  000277                  SCC                     ;SET CC=1011
006476  000244                  CLZ
006500  105710                  TSTB    (R0)            ;TRY TO TST AN ODD BYTE
006502  102403                  BVS     SNMB1C          ;CHECK CC=0100
006504  103402                  BCS     SNMB1C
006506  100401                  BMI     SNMB1C
006510  001404                  BEQ     TST100
```

```
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                        ;           WHICH FOLLOWS W/ 751             <====
006512                      SNMB1C:
006512  012742  000154              MOV     #154,-(R2)  ;MOVE TO MAILBOX #  *******  154  *******
006516  005242                      INC     -(R2)       ;SET MSGTYP TO FATAL ERROR
006520  000000                      HALT                ;CC'S NOT CORRECT
                                                        ;  OR SEQUENCE ERROR

                            ;*************************************************************************
                            ;
                            ;       THIS TEST VERIFIES THE SINGLE-OPERAND NON-MODIFYING INSTRUCTIONS
                            ;USING MODE 2.  IT USES THE IDENTICAL PROCEDURE EMPLOYED IN THE
                            ;MODE 1 TESTS.  ADDITIONALLY, THE REGISTER IS CHECKED TO ASSURE THAT
                            ;IT IS INCREMENTED PROPERLY.
                            ;
                            ;*************************************************************************
                            ;TEST 100       TEST MODE 2 WITH SOP NON-MODIFYING
                            ;*************************************************************************
006522  005212              TST100: INC     (R2)        ;UPDATE TEST NUMBER
006524  022712  000100              CMP     #100,(R2)   ;SEQUENCE ERROR?
006530  001020                      BNE     TST101-10   ;BR TO ERROR HALT ON SEQ ERROR
006532  005000                      CLR     R0          ;INITIALIZE R0=0
006534  005010                      CLR     (R0)        ;CLEAR LOC 0
006536  000277                      SCC                 ;SET CC=1011
006540  000244                      CLZ
006542  005720                      TST     (R0)+       ;TRY TST W/ MODE 2
006544  102403                      BVS     SNM2A       ;CHECK CC=0100
006546  103402                      BCS     SNM2A
006550  100401                      BMI     SNM2A
006552  001404                      BEQ     SNM2B
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                        ;           WHICH FOLLOWS W/ 766             <====
006554                      SNM2A:
006554  012742  000155              MOV     #155,-(R2)  ;MOVE TO MAILBOX #  *******  155  *******
006560  005242                      INC     -(R2)       ;SET MSGTYP TO FATAL ERROR
006562  000000                      HALT                ;CC'S NOT CORRECT
006564  005300              SNM2B:  DEC     R0          ;RESET R0
006566  005300                      DEC     R0
006570  001404                      BEQ     TST101
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                        ;           WHICH FOLLOWS W/ 757             <====
006572  012742  000156              MOV     #156,-(R2)  ;MOVE TO MAILBOX #  *******  156  *******
006576  005242                      INC     -(R2)       ;SET MSGTYP TO FATAL ERROR
006600  000000                      HALT                ;MODE 2 DID NOT INC REQ CORRECTLY
                                                        ;  OR SEQUENCE ERROR

                            ;*************************************************************************
                            ;
                            ;       THIS TEST VERIFIES MODE 2 SINGLE OPERAND NON-MODIFYING BYTE
                            ;INSTRUCTIONS IT USES R0 TO POINT TO LOC. 0.  WITH LOCATION 0
                            ;SET TO 377, THE EVEN AND ODD BYTE IS TESTED WITH TSTB INSTRUCTIONS
```

```
   1305                                    ;TO VERIFY THE CORRECT CC ARE SET.  THE REGISTER IS CHECKED FOR
   1306                                    ;PROPER INCREMENTING.
   1307                                    ;
   1308                                    ;*******************************************************************************
                                           ;TEST 101         TEST MODE 2 - BYTE W/ SOP NON-MODIFYING
                                           ;*******************************************************************************
        006602  005212                     TST101: INC      (R2)              ;UPDATE TEST NUMBER
        006604  022712  000101                     CMP      #101,(R2)         ;SEQUENCE ERROR?
        006610  001042                             BNE      TST102-10         ;BR TO ERROR HALT ON SEQ ERROR
   1309 006612  005000                             CLR      R0                ;CLEAR R0
   1310 006614  005010                             CLR      (R0)              ;CLEAR LOC 0
   1311 006616  105110                             COMB     (R0)              ;SET LOC 0=377
   1312 006620  000277                             SCC                        ;SET CC=0111
   1313 006622  000250                             CLN
   1314 006624  105720                             TSTB     (R0)+             ;TRY TST OF EVEN BYTE
   1315 006626  102402                             BVS      SNMB2A
   1316 006630  101401                             BLOS     SNMB2A
   1317·006632  100404                             BMI      SNMB2B
                                                                              ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                              ;           CONDITIONAL BRANCH INST. AND    <====
                                                                              ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                              ;           WHICH FOLLOWS W/ 766            <====
        006634                             SNMB2A:
        006634  012742  000157                     MOV      #157,-(R2)        ;MOVE TO MAILBOX #  *******  157  *******
        006640  005242                             INC      -(R2)             ;SET MSGTYP TO FATAL ERROR
        006642  000000                             HALT                       ;CC'S NOT SET CORRECTLY
   1318 006644  005300                     SNMB2B: DEC      R0                ;DECREMENT R0
   1319 006646  001404                             BEQ      SNMB2C
                                                                              ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                              ;           CONDITIONAL BRANCH INST. AND    <====
                                                                              ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                              ;           WHICH FOLLOWS W/ 760            <====
        006650  012742  000160                     MOV      #160,-(R2)        ;MOVE TO MAILBOX #  *******  160  *******
        006654  005242                             INC      -(R2)             ;SET MSGTYP TO FATAL ERROR
        006656  000000                             HALT                       ;MODE 2 DID NOT INC REG CORRECTLY
   1320 006660  005200                     SNMB2C: INC      R0                ;POINT TO ODD BYTE
   1321 006662  000277                             SCC                        ;SET CC=1011
   1322 006664  000244                             CLZ
   1323 006666  105720                             TSTB     (R0)+             ;TRY TST OF ODD BYTE
   1324 006670  102403                             BVS      SNMB2D            ;CHECK CC'S=0100
   1325 006672  103402                             BCS      SNMB2D
   1326 006674  100401                             BMI      SNMB2D
   1327 006676  001404                             BEQ      SNMB2E
                                                                              ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                              ;           CONDITIONAL BRANCH INST. AND    <====
                                                                              ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                              ;           WHICH FOLLOWS W/ 744            <====
        006700                             SNMB2D:
        006700  012742  000161                     MOV      #161,-(R2)        ;MOVE TO MAILBOX #  *******  161  *******
        006704  005242                             INC      -(R2)             ;SET MSGTYP TO FATAL ERROR
        006706  000000                             HALT                       ;CC'S NOT CORRECT
   1328 006710  005300                     SNMB2E: DEC      R0
   1329 006712  005300                             DEC      R0
   1330 006714  001404                             BEQ      TST102
                                                                              ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                              ;           CONDITIONAL BRANCH INST. AND    <====
                                                                              ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;               WHICH FOLLOWS W/ 735        <====
 006716  012742  000162                 MOV     #162,-(R2)              ;MOVE TO MAILBOX #  *******  162  *******
 006722  005242                         INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
 006724  000000                         HALT                            ;R0 DID NOT INCREMENT PROPERLY
                                                                        ;  OR SEQUENCE ERROR

                                ;*******************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 3 SINGLE OPERAND NON-MODIFYING INSTRUCTIONS.
                                ;A POINTER IN A TABLE AT LOC. 376 IS USED TO TEST LOCATION 0.
                                ;THE CC'S AND THE REGISTER ARE CHECKED FOLLOWING THE
                                ;TST MODE 3 INSTRUCTION.
                                ;
                                ;*******************************************************************************
                                ;TEST 102       TEST MODE 3 W/ SOP NON-MODIFYING INSTS
                                ;*******************************************************************************
 006726  005212                 TST102: INC     (R2)                    ;UPDATE TEST NUMBER
 006730  022712  000102                 CMP     #102,(R2)               ;SEQUENCE ERROR?
 006734  001022                         BNE     TST103-10               ;BR TO ERROR HALT ON SEQ ERROR
 006736  005000                         CLR     R0                      ;R0=0
 006740  005010                         CLR     (R0)                    ;CLEAR LOC 0
 006742  105100                         COMB    R0                      ;R0=376
 006744  005300                         DEC     R0
 006746  000277                         SCC                             ;SET CC=1011
 006750  000244                         CLZ
 006752  005730                         TST     @(R0)+                  ;TRY TST W/ MODE 3
 006754  102403                         BVS     SNM3A                   ;CHECK CC=0100
 006756  103402                         BCS     SNM3A
 006760  100401                         BMI     SNM3A
 006762  001404                         BEQ     SNM3B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 764            <====
 006764                         SNM3A:
 006764  012742  000163                 MOV     #163,-(R2)              ;MOVE TO MAILBOX #  *******  163  *******
 006770  005242                         INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
 006772  000000                         HALT                            ;CC'S NOT CORRECT
 006774  005300                 SNM3B:  DEC     R0                      ;R0=377
 006776  105100                         COMB    R0                      ;R0=0
 007000  001404                         BEQ     TST103
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 755            <====
 007002  012742  000164                 MOV     #164,-(R2)              ;MOVE TO MAILBOX #  *******  164  *******
 007006  005242                         INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
 007010  000000                         HALT                            ;MODE 3 DID NOT INC REG CORRECTLY
                                                                        ;  OR SEQUENCE ERROR

                                ;*******************************************************************************
                                ;
                                ;       THIS TEST VERIFIES SOP NON-MODIFYING BYTE INSTRUCTIONS MODE 3
                                ;LOC. 0 IS SET TO 377.  TABLE AT LOC. 402-404 IS USED TO TEST
                                ;BYTE 0 AND BYTE 1.  THE REGISTER IS CHECKED FOR PROPER INCREMENTING AND
                                ;THE CC'S ARE VERIFIED.
                                ;       THE TABLE AT LOC. 402-404 SHOULD CONTAIN 0 AND 1 BEFORE AND
```

```
                                     ;AFTER THE TEST IS RUN.
                                     ;
                                     ;*************************************************************************
                                     ;TEST 103          TEST MODE 3 - BYTES W/ SOP NON-MODIFYING INSTS.
                                     ;*************************************************************************
007012  005212                       TST103: INC    (R2)               ;UPDATE TEST NUMBER
007014  022712  000103                       CMP    #103,(R2)          ;SEQUENCE ERROR?
007020  001036                               BNE    TST104-10          ;BR TO ERROR HALT ON SEQ ERROR
007022  005000                               CLR    R0                 ;R0=0
007024  005010                               CLR    (R0)               ;CLEAR LOC 0
007026  105110                               COMB   (R0)               ;LOC. 0 =377
007030  105100                               COMB   R0
007032  005200                               INC    R0
007034  005720                               TST    (R0)+              ;R0=402
007036  000277                               SCC                       ;CC=0111
007040  000250                               CLN
007042  105730                               TSTB   @(R0)+             ;TRY TST OF EVEN BYTE
007044  102402                               BVS    SNMB3A             ;CHECK CC=1000
007046  101401                               BLOS   SNMB3A
007050  100404                               BMI    SNMB3B
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 763            <====
007052                               SNMB3A:
007052  012742  000165                       MOV    #165,-(R2)         ;MOVE TO MAILBOX #  *******  165  *******
007056  005242                               INC    -(R2)              ;SET MSGTYP TO FATAL ERROR
007060  000000                               HALT                      ;CC'S NOT CORRECT
007062  000277                       SNMB3B: SCC                       ;SET CC=1011
007064  000244                               CLZ
007066  105730                               TSTB   @(R0)+             ;TRY TST OF ODD BYTE
007070  102403                               BVS    SNMB3C             ;CHECK CC=0100
007072  103402                               BCS    SNMB3C
007074  100401                               BMI    SNMB3C
007076  001404                               BEQ    SNMB3D
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 750            <====
007100                               SNMB3C:
007100  012742  000166                       MOV    #166,-(R2)         ;MOVE TO MAILBOX #  *******  166  *******
007104  005242                               INC    -(R2)              ;SET MSGTYP TO FATAL ERROR
007106  000000                               HALT                      ;CC'S NOT CORRECT
007110  005720                       SNMB3D: TST    (R0)+              ;R0=410
007112  005710                               TST    (R0)
007114  100404                               BMI    TST104
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 741            <====
007116  012742  000167                       MOV    #167,-(R2)         ;MOVE TO MAILBOX #  *******  167  *******
007122  005242                               INC    -(R2)              ;SET MSGTYP TO FATAL ERROR
007124  000000                               HALT                      ;TSTB DID NOT INCREMENT R0 CORRETCLY
                                                                       ;  OR SEQUENCE ERROR
                                     ;*************************************************************************
                                     ;
                                     ;       THIS TEST VERIFIES MODE 4 SOP NON-MODIFYING INSTRUCTIONS.
```

```
                                ;LOC. 0 IS SET TO -1 AND THE CC'S ARE SET TO THE COMPLEMENT OF THE
                                ;EXPECTED RESULTS.  RO AND SET TO 2 AND A TST MODE 4 IS EXECUTED.
                                ;THE CC'S ARE CHECKED WITH CONDITIONAL BRANCH INSTRUCTIONS AND THE REGISTER
                                ;IS CHECKED FOR PROPER DECREMENTING.
                                ;
                                ;*******************************************************************************
                                ;TEST 104        TEST MODE 4 W/ SOP NON-MODIFYING INSTS
                                ;*******************************************************************************
007126  005212                  TST104: INC     (R2)            ;UPDATE TEST NUMBER
007130  022712  000104                  CMP     #104,(R2)       ;SEQUENCE ERROR?
007134  001017                          BNE     TST105-10       ;BR TO ERROR HALT ON SEQ ERROR
007136  005000                          CLR     R0              ;R0=0
007140  005010                          CLR     (R0)            ;LOC 0=0
007142  005120                          COM     (R0)+           ;LOC 0=-1
007144  000277                          SCC                     ;SET CC=1011
007146  000244                          CLZ
007150  005740                          TST     -(R0)           ;TRY TST W/ MODE 4
007152  102402                          BVS     SNM4A           ;CHECK CC=0100
007154  101401                          BLOS    SNM4A
007156  100404                          BMI     SNM4B
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 766            <====
007160                          SNM4A:
007160  012742  000170                  MOV     #170,-(R2)      ;MOVE TO MAILBOX #  *******  170  *******
007164  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
007166  000000                          HALT                    ;CC'S NOT CORRECT
007170  005700                  SNM4B:  TST     R0
007172  001404                          BEQ     TST105
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 760            <====
007174  012742  000171                  MOV     #171,-(R2)      ;MOVE TO MAILBOX #  *******  171  *******
007200  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
007202  000000                          HALT                    ;TST MODE 4 DID NOT DEC R0 CORRECTLY
                                                                ;  OR SEQUENCE ERROR

                                ;*******************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 5 SOP NON-MODIFYING INSTRUCTIONS.
                                ;IT USES A POINTER AT LOC. 376 TO TEST LOC. 0.  R0 IS SET
                                ;TO 400, A TST MODE 5 INSTRUCTION IS EXECUTED AND THE CC'S CHECKED.
                                ;R0 IS CHECKED TO INSURE PROPER DECREMENTING.
                                ;
                                ;*******************************************************************************
                                ;TEST 105        TEST MODE 5 W/ SOP NON-MODIFYING INSTS
                                ;*******************************************************************************
007204  005212                  TST105: INC     (R2)            ;UPDATE TEST NUMBER
007206  022712  000105                  CMP     #105,(R2)       ;SEQUENCE ERROR?
007212  001022                          BNE     TST106-10       ;BR TO ERROR HALT ON SEQ ERROR
007214  005000                          CLR     R0              ;R0=0
007216  005010                          CLR     (R0)            ;LOC 0=0
007220  005110                          COM     (R0)            ;LOC 0=-1
007222  105100                          COMB    R0              ;R0=377
007224  005200                          INC     R0              ;R0=400
```

```
007226  000277                       SCC     	            ;SET CC=0111
007230  000250                       CLN
007232  005750                       TST     @-(R0)         ;TRY TST W/ MODE 5
007234  102402                       BVS     SNM5A          ;CHECK CC=1000
007236  101401                       BLOS    SNM5A
007240  100404                       BMI     SNM5B
                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                            ;           WHICH FOLLOWS W/ 764            <====
007242                      SNM5A:
007242  012742  000172               MOV     #172,-(R2)     ;MOVE TO MAILBOX #  *******  172  *******
007246  005242                       INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
007250  000000                       HALT                   ;CC'S NOT SET PROPERLY
007252  005200              SNM5B:   INC     R0             ;R0=377
007254  105100                       COMB    R0             ;R0=0
007256  001404                       BEQ     TST106
                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                            ;           WHICH FOLLOWS W/ 755            <====
007260  012742  000173               MOV     #173,-(R2)     ;MOVE TO MAILBOX #  *******  173  *******
007264  005242                       INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
007266  000000                       HALT                   ;MODE 5 DID NOT DEC R0 CORRECTLY
                                                            ;  OR SEQUENCE ERROR

                            ;*******************************************************************************
                            ;
                            ;        THIS TEST VERIFIES MODE 6 SOP NON-MODIFYING INSTRUCTIONS.
                            ;R0 IS SET TO 377 AND A MODE 6 TST INSTRUCTION IS EXECUTED
                            ;USING R0 AND AN OFFSET OF -377.  THE CC'S ARE CHECKED AS WELL
                            ;AS R0 TO INSURE IT WAS NOT ALTERED.
                            ;
                            ;*******************************************************************************
                            ;TEST 106        TEST MODE 6 W/ SOP NON-MODIFYING INSTS
                            ;*******************************************************************************
007270  005212              TST106:  INC     (R2)           ;UPDATE TEST NUMBER
007272  022712  000106               CMP     #106,(R2)      ;SEQUENCE ERROR?
007276  001021                       BNE     TST107-10      ;BR TO ERROR HALT ON SEQ ERROR
007300  005000                       CLR     R0             ;R0=0
007302  005010                       CLR     (R0)           ;LOC 0=0
007304  005110                       COM     (R0)           ;LOC 0=-1
007306  105100                       COMB    R0             ;R0=377
007310  000277                       SCC                    ;SET CC=0111
007312  000250                       CLN
007314  005760  177401               TST     -377(R0)       ;TRY TST W/ MODE 6
007320  102402                       BVS     SNM6A          ;CHECK CC=1000
007322  101401                       BLOS    SNM6A
007324  100404                       BMI     SNM6B
                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                            ;           WHICH FOLLOWS W/ 764            <====
007326                      SNM6A:
007326  012742  000174               MOV     #174,-(R2)     ;MOVE TO MAILBOX #  *******  174  *******
007332  005242                       INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
007334  000000                       HALT                   ;CC'S INCORRECT
```

```
 007336  105100                  SNM6B:  COMB    R0                      ;R0=0
 007340  001404                          BEQ     TST107
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                         ;           CONDITIONAL BRANCH INST. AND      <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                         ;           WHICH FOLLOWS W/ 756              <====
 007342  012742  000175                  MOV     #175,-(R2)              ;MOVE TO MAILBOX #  *******  175  *******
 007346  005242                          INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
 007350  000000                          HALT                            ;TST MODE 6 INCORRECTLY CHANGED R0
                                                                         ;  OR SEQUENCE ERROR

                                 ;*******************************************************************************
                                 ;
                                 ;
                                 ;       THIS TEST VERIFIES MODE 7 SOP NON-MODIFYING INSTRUCTIONS.
                                 ;IT USES A POINTER TO LOC. 0 STORED AT LOC. 400 TO TST LOC. 0.
                                 ;R0 IS SET TO 377 AND LOC. 0 IS TESTED THRU THE POINTER AT 400 USING
                                 ;R0 AND AN OFFSET OF 1.
                                 ;
                                 ;*******************************************************************************
                                 ;TEST 107        TEST MODE 7 W/ SOP NON-MODIFYING INSTS.
                                 ;*******************************************************************************
 007352  005212                  TST107: INC     (R2)                    ;UPDATE TEST NUMBER
 007354  022712  000107                  CMP     #107,(R2)               ;SEQUENCE ERROR?
 007360  001021                          BNE     TST110-10               ;BR TO ERROR HALT ON SEQ ERROR
 007362  005000                          CLR     R0                      ;R0=0
 007364  005010                          CLR     (R0)                    ;LOC 0=0
 007366  005110                          COM     (R0)                    ;LOC 0=-1
 007370  105100                          COMB    R0                      ;R0=377
 007372  000277                          SCC                             ;CC=0111
 007374  000250                          CLN
 007376  005770  000001                  TST     @1(R0)                  ;TRY TST W/ MODE 7
 007402  102402                          BVS     SNM7A                   ;CHECK CC=1000
 007404  101401                          BLOS    SNM7A
 007406  100404                          BMI     SNM7B
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                         ;           CONDITIONAL BRANCH INST. AND      <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                         ;           WHICH FOLLOWS W/ 764              <====
 007410                          SNM7A:
 007410  012742  000176                  MOV     #176,-(R2)              ;MOVE TO MAILBOX #  *******  176  *******
 007414  005242                          INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
 007416  000000                          HALT                            ;CC'S NOT CORRECT
 007420  105100                  SNM7B:  COMB    R0                      ;R0=0
 007422  001404                          BEQ     TST110
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                         ;           CONDITIONAL BRANCH INST. AND      <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                         ;           WHICH FOLLOWS W/ 756              <====
 007424  012742  000177                  MOV     #177,-(R2)              ;MOVE TO MAILBOX #  *******  177  *******
 007430  005242                          INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
 007432  000000                          HALT                            ;TST MODE 7 INCORRECTLY CHANGED R0
                                                                         ;  OR SEQUENCE ERROR

                                 ;*******************************************************************************
                                 ;
                                 ;
                                 ;       THIS TEST VERIFIES MODE 0 DOUBLE OPERAND INSTRUCTIONS.  IT SETS
                                 ;DATA IN R0 AND R4 AND USES THE ADD INSTRUCTION TO TEST THE DOP
```

```
                                        ;MICROCODE.
                                        ;
                                        ;*******************************************************************************
                                        ;TEST 110        TEST MODE 0 DOUBLE-OPERAND (DOP) INSTS.
                                        ;*******************************************************************************
     007434  005212                     TST110: INC     (R2)            ;UPDATE TEST NUMBER
     007436  022712  000110                     CMP     #110,(R2)       ;SEQUENCE ERROR?
     007442  001006                             BNE     TST111-10       ;BR TO ERROR HALT ON SEQ ERROR
     007444  005000                             CLR     R0              ;R0=0
     007446  005100                             COM     R0              ;R0=-1
     007450  005004                             CLR     R4              ;R4=0
     007452  060004                             ADD     R0,R4           ;TRY ADD: R4=-1
     007454  005204                             INC     R4              ;R4=0
     007456  001404                             BEQ     TST111
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 771             <====
     007460  012742  000200                     MOV     #200,-(R2)      ;MOVE TO MAILBOX #  *******  200  *******
     007464  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     007466  000000                             HALT                    ;ADD INST. FAILED W/ MODE 0
                                                                        ;  OR SEQUENCE ERROR

                                        ;*******************************************************************************
                                        ;
                                        ;        THIS TEST VERIFIES THE MOVE INSTRUCTION WITH MODE 0 TO MODE 0.
                                        ;THIS TEST IS NECESSARY BECAUSE THIS PARTICULAR INSTRUCTION UTILIZES UNIQUE
                                        ;MICROCODE.
                                        ;
```

```
 1494                                    ;*******************************************************************************
                                         ;TEST 111        MOV MODE 0 TO MODE 0
                                         ;*******************************************************************************
      007470  005212                     TST111: INC     (R2)            ;UPDATE TEST NUMBER
      007472  022712  000111                     CMP     #111,(R2)       ;SEQUENCE ERROR?
      007476  001006                             BNE     TST112-10       ;BR TO ERROR HALT ON SEQ ERROR
 1495 007500  005000                             CLR     R0              ;R0=0
 1496 007502  005004                             CLR     R4              ;R4=0
 1497 007504  005100                             COM     R0              ;R0=-1
 1498 007506  010004                             MOV     R0,R4           ;TRY MOVE -1 TO R4
 1499 007510  005204                             INC     R4              ;INC R4
 1500 007512  001404                             BEQ     TST112
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                         ;           CONDITIONAL BRANCH INST. AND    <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                         ;           WHICH FOLLOWS W/ 771            <====
      007514  012742  000201                     MOV     #201,-(R2)      ;MOVE TO MAILBOX #  *******  201   *******
      007520  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      007522  000000                             HALT                    ;MOVE FAILED MODE 0 TO MODE 0
                                                                         ;  OR SEQUENCE ERROR
 1501
 1502                                    ;*******************************************************************************
 1503                                    ;
 1504                                    ;       THIS TEST VERIFIES THE SUBTRACT INSTRUCTION WITH MODE 0,0.
 1505                                    ;THIS TEST IS NECESSARY BECAUSE THIS PARTICULAR INSTRUCTION UTILIZES SOME
 1506                                    ;UNIQUE MICROCODE.
 1507                                    ;
 1508                                    ;*******************************************************************************
                                         ;TEST 112        TEST SUB MODE 0,0
                                         ;*******************************************************************************
      007524  005212                     TST112: INC     (R2)            ;UPDATE TEST NUMBER
      007526  022712  000112                     CMP     #112,(R2)       ;SEQUENCE ERROR?
      007532  001016                             BNE     TST113-10       ;BR TO ERROR HALT ON SEQ ERROR
 1509 007534  005000                             CLR     R0              ;R0=0
 1510 007536  005004                             CLR     R4              ;R4=0
 1511 007540  005204                             INC     R4              ;R4=1
 1512 007542  160400                             SUB     R4,R0           ;TRY SUB 0,0   R0=-1
 1513 007544  100003                             BPL     SUB0            ;CC=1001
 1514 007546  001402                             BEQ     SUB0
 1515 007550  102401                             BVS     SUB0
 1516 007552  103404                             BCS     SUB0A
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                         ;           CONDITIONAL BRANCH INST. AND    <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                         ;           WHICH FOLLOWS W/ 767            <====
      007554                             SUB0:
      007554  012742  000202                     MOV     #202,-(R2)      ;MOVE TO MAILBOX #  *******  202   *******
      007560  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      007562  000000                             HALT                    ;CONDITION CODE FAILED ON SUB
 1517 007564  005200                     SUB0A:  INC     R0
 1518 007566  001404                             BEQ     TST113
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                         ;           CONDITIONAL BRANCH INST. AND    <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                         ;           WHICH FOLLOWS W/ 761            <====
      007570  012742  000203                     MOV     #203,-(R2)      ;MOVE TO MAILBOX #  *******  203   *******
      007574  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      007576  000000                    HALT                      ;DATA RESULT OF SUB FAILED
                                                                  ;  OR SEQUENCE ERROR
 1519
 1520                          ;*************************************************************************************
 1521                          ;
 1522                          ;        THIS TEST QUICKLY VERIFIES THE REMAINING DOP MODIFYING INSTRUCTIONS
 1523                          ;WITH MODE 0,0 TO PROVIDE A BASELINE FOR SUBSEQUENT TESTS.
 1524                          ;SINGLE OPERAND INSTRUCTIONS ARE USED TO SET UP DATA IN R0 AND R4
 1525                          ;BEFORE EACH OF THE SEVERAL DOP MODIFYING INSTRUCTIONS ARE USED AND
 1526                          ;VERIFIED.
 1527                          ;
 1528                          ;*************************************************************************************
                               ;TEST 113       TEST ALL THE DOP INSTRUCTIONS W/ SOURCE MODE 0,0
                               ;*************************************************************************************
      007600  005212           TST113: INC     (R2)               ;UPDATE TEST NUMBER
      007602  022712  000113           CMP     #113,(R2)          ;SEQUENCE ERROR?
      007606  001051                   BNE     TST114-10          ;BR TO ERROR HALT ON SEQ ERROR
 1529 007610  005000                   CLR     R0                 ;R0=0
 1530 007612  010004                   MOV     R0,R4              ;TRY MOVE MODE 0,0
 1531 007614  001404                   BEQ     DOP0A
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                  ;           CONDITIONAL BRANCH INST. AND      <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                  ;           WHICH FOLLOWS W/ 774              <====
      007616  012742  000204           MOV     #204,-(R2)         ;MOVE TO MAILBOX #  *******  204  *******
      007622  005242                   INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
      007624  000000                   HALT                       ;Z-BIT NOT SET
 1532 007626  005200           DOP0A:  INC     R0                 ;R0=1
 1533 007630  005100                   COM     R0                 ;R0=177776
 1534 007632  005104                   COM     R4                 ;R4=177777
 1535 007634  040004                   BIC     R0,R4              ;TRY BIC: R4=1
 1536 007636  005304                   DEC     R4                 ;R4=0
 1537 007640  001404                   BEQ     DOP0B
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                  ;           CONDITIONAL BRANCH INST. AND      <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                  ;           WHICH FOLLOWS W/ 762              <====
      007642  012742  000205           MOV     #205,-(R2)         ;MOVE TO MAILBOX #  *******  205  *******
      007646  005242                   INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
      007650  000000                   HALT                       ;BIC CLEAR RESULT INCORRECT
 1538 007652  050004           DOP0B:  BIS     R0,R4              ;TRY BIS: R4=177777
 1539 007654  005204                   INC     R4
 1540 007656  005204                   INC     R4                 ;R4=0
 1541 007660  001404                   BEQ     DOP0C
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                  ;           CONDITIONAL BRANCH INST. AND      <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                  ;           WHICH FOLLOWS W/ 752              <====
      007662  012742  000206           MOV     #206,-(R2)         ;MOVE TO MAILBOX #  *******  206  *******
      007666  005242                   INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
      007670  000000                   HALT                       ;RESULT OF BIS INCORRECT
 1542 007672  005000           DOP0C:  CLR     R0                 ;R0=0
 1543 007674  105100                   COMB    R0                 ;R0=377
 1544 007676  005004                   CLR     R4                 ;R4=0
 1545 007700  005104                   COM     R4                 ;R4=177777
 1546 007702  040004                   BIC     R0,R4              ;R4=177400
 1547 007704  060004                   ADD     R0,R4              ;TRY ADD: R4=177777
```

```
  1548 007706  005204                    INC     R4              ;R4=0
  1549 007710  001404                    BEQ     DOPOD
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                 ;           CONDITIONAL BRANCH INST. AND     <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                 ;           WHICH FOLLOWS W/ 736             <====
       007712  012742  000207            MOV     #207,-(R2)      ;MOVE TO MAILBOX #  *******  207  *******
       007716  005242                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       007720  000000                    HALT                    ;RESULT OF ADD INCORRECT
  1550 007722  160004           DOPOD:   SUB     R0,R4           ;177401=R4
  1551 007724  105404                    NEGB    R4              ;R4=177777
  1552 007726  005204                    INC     R4              ;RD=0
  1553 007730  001404                    BEQ     TST114
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                 ;           CONDITIONAL BRANCH INST. AND     <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                 ;           WHICH FOLLOWS W/ 726             <====
       007732  012742  000210            MOV     #210,-(R2)      ;MOVE TO MAILBOX #  *******  210  *******
       007736  005242                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       007740  000000                    HALT                    ;RESULT OF SUB INCORRECT
                                                                 ;  OR SEQUENCE ERROR
  1554
  1555                          ;*******************************************************************************
  1556                          ;
  1557                          ;          THIS TEST VERIFIES MODE 0,X DOUBLE OPERAND INSTRUCTIONS.  IT SETS
  1558                          ;DATA IN R0 AND LOCATION 0 AND OPERATES UPON IT USING DOP INSTRUCTIONS.
  1559                          ;
  1560                          ;*******************************************************************************
                                ;TEST 114        TEST MODE 0,X DOUBLE-OPERAND INSTRUCTIONS
                                ;*******************************************************************************
       007742  005212           TST114:  INC     (R2)            ;UPDATE TEST NUMBER
       007744  022712  000114            CMP     #114,(R2)       ;SEQUENCE ERROR?
       007750  001024                    BNE     TST115-10       ;BR TO ERROR HALT ON SEQ ERROR
  1561 007752  005000                    CLR     R0              ;R0=0
  1562 007754  005010                    CLR     (R0)            ;LOC. 0=0
  1563 007756  105110                    COMB    (R0)            ;LOC. 0=377
  1564 007760  005220                    INC     (R0)+           ;LOC. 0=400   R0=2
  1565 007762  005400                    NEG     R0              ;R0=-2
  1566 007764  060037  000000            ADD     R0,@#0          ;TRY ADD 0,3;  LOC. 0=376
  1567 007770  100403                    BMI     DOP03A          ;CC=0001?
  1568 007772  001402                    BEQ     DOP03A
  1569 007774  102401                    BVS     DOP03A
  1570 007776  103404                    BCS     DOP03B
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                 ;           CONDITIONAL BRANCH INST. AND     <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                 ;           WHICH FOLLOWS W/ 764             <====
       010000                   DOP03A:
       010000  012742  000211            MOV     #211,-(R2)      ;MOVE TO MAILBOX #  *******  211  *******
       010004  005242                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       010006  000000                    HALT                    ;CC'S NOT SET CORRECTLY
  1571 010010  105137  000000   DOP03B:  COMB    @#0             ;LOC. 0=1
  1572 010014  005337  000000            DEC     @#0             ;LOC. 0=0
  1573 010020  001404                    BEQ     TST115
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                 ;           CONDITIONAL BRANCH INST. AND     <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;               WHICH FOLLOWS W/ 753          <====
     010022  012742  000212             MOV     #212,-(R2)      ;MOVE TO MAILBOX #  *******  212  *******
     010026  005242                     INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     010030  000000                     HALT                    ;DATA RESULT INCORRECT
                                                                ;  OR SEQUENCE ERROR
                                ;*******************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 0,0 DOP NON-MODIFYING INSTRUCTIONS.
                                ;R0 AND R4 ARE PRESET TO 0 AND 1 RESPECTIVELY.  COMPARE INSTRUCTIONS ARE
                                ;THEN EXECUTED AND CHECKED.  FIRST R4 IS COMPARED TO R0 THEN R0 TO R4.
                                ;
                                ;*******************************************************************************
                                ;TEST 115       TEST DOP NON-MODIFYING INST. W/ SOURCE MODE 0,0
                                ;*******************************************************************************
     010032  005212             TST115: INC     (R2)            ;UPDATE TEST NUMBER
     010034  022712  000115             CMP     #115,(R2)       ;SEQUENCE ERROR?
     010040  001042                     BNE     TST116-10       ;BR TO ERROR HALT ON SEQ ERROR
     010042  005000                     CLR     R0              ;R0=0
     010044  005004                     CLR     R4              ;R4=0
     010046  005204                     INC     R4              ;R4=1
     010050  020400                     CMP     R4,R0           ;TRY COMPARE R4 TO R0
     010052  003004                     BGT     DNM1
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                ;           CONDITIONAL BRANCH INST. AND      <====
                                                                ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                ;           WHICH FOLLOWS W/ 772              <====
     010054  012742  000213             MOV     #213,-(R2)      ;MOVE TO MAILBOX #  *******  213  *******
     010060  005242                     INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     010062  000000                     HALT                    ;CC'S NOT CORRECT FOR CMP
     010064  020004             DNM1:   CMP     R0,R4           ;TRY COMPARE R0 TO R4
     010066  002404                     BLT     DNM2
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                ;           CONDITIONAL BRANCH INST. AND      <====
                                                                ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                ;           WHICH FOLLOWS W/ 764              <====
     010070  012742  000214             MOV     #214,-(R2)      ;MOVE TO MAILBOX #  *******  214  *******
     010074  005242                     INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     010076  000000                     HALT                    ;CC'S NOT CORRECT FOR CMP
     010100  005200             DNM2:   INC     R0              ;R0=1
     010102  020400                     CMP     R4,R0           ;TRY COMPARE R4=1 TO R0=1
     010104  001404                     BEQ     DNM3
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                ;           CONDITIONAL BRANCH INST. AND      <====
                                                                ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                ;           WHICH FOLLOWS W/ 755              <====
     010106  012742  000215             MOV     #215,-(R2)      ;MOVE TO MAILBOX #  *******  215  *******
     010112  005242                     INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     010114  000000                     HALT                    ;CC'S NOT CORRECT (Z=1) FOR CMP
     010116  005000             DNM3:   CLR     R0              ;R0=0
     010120  005100                     COM     R0              ;R0=177777
     010122  005004                     CLR     R4              ;R4=0
     010124  030004                     BIT     R0,R4           ;TRY BIT R0 TO R4
     010126  001404                     BEQ     DNM4
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                ;           CONDITIONAL BRANCH INST. AND      <====
                                                                ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                ;           WHICH FOLLOWS W/ 744              <====
     010130  012742  000216              MOV     #216,-(R2)      ;MOVE TO MAILBOX #  *******  216  *******
     010134  005242                      INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     010136  000000                      HALT                    ;CC'S NOT CORRECT FOR BIT
1596 010140  005304             DNM4:    DEC     R4              ;R4=177777
1597 010142  030004                      BIT     R0,R4           ;TRY BIT AGAIN
1598 010144  100404                      BMI     TST116
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                 ;           CONDITIONAL BRANCH INST. AND   <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                 ;           WHICH FOLLOWS W/ 735           <====
     010146  012742  000217              MOV     #217,-(R2)      ;MOVE TO MAILBOX #  *******  217  *******
     010152  005242                      INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     010154  000000                      HALT                    ;CC'S NOT CORRECT FOR BIT
                                                                 ;  OR SEQUENCE ERROR
1599                                    ;*******************************************************************************
1600                                    ;
1601                                    ;               THIS TEST VERIFIES MODE 0,X DOUBLE OPERAND NON-MODIFYING INSTRUCTIONS.
1602                                    ;IT SETS DATA IN R0 AND LOCATION 0 AND COMPARES THEM USING DOPNM INSTRUCTIONS.
1603                                    ;
1604                                    ;*******************************************************************************
                                        ;TEST 116          TEST MODE 0,X DOUBLE-OPERAND NON-MODIFYING INSTS.
                                        ;*******************************************************************************
     010156  005212             TST116:  INC     (R2)            ;UPDATE TEST NUMBER
     010160  022712  000116              CMP     #116,(R2)       ;SEQUENCE ERROR?
     010164  001022                      BNE     TST117-10       ;BR TO ERROR HALT ON SEQ ERROR
1605 010166  005000                      CLR     R0              ;R0=0
1606 010170  005010                      CLR     (R0)            ;LOC. 0=0
1607 010172  005110                      COM     (R0)            ;LOC. 0=177777
1608 010174  005200                      INC     R0              ;R0=1
1609 010176  020037  000000              CMP     R0,@#0          ;TRY CMP MODE 0,3
1610 010202  100403                      BMI     DNM03A          ;CC=0001
1611 010204  001402                      BEQ     DNM03A
1612 010206  102401                      BVS     DNM03A
1613 010210  103404                      BCS     DNM03B
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                 ;           CONDITIONAL BRANCH INST. AND   <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                 ;           WHICH FOLLOWS W/ 765           <====
     010212                     DNM03A:
     010212  012742  000220              MOV     #220,-(R2)      ;MOVE TO MAILBOX #  *******  220  *******
     010216  005242                      INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     010220  000000                      HALT                    ;CC'S NOT SET CORRECTLY
1614 010222  005300             DNM03B:  DEC     R0
1615 010224  001002                      BNE     DNM03C
1616 010226  005210                      INC     (R0)
1617 010230  001404                      BEQ     TST117
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                 ;           CONDITIONAL BRANCH INST. AND   <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                 ;           WHICH FOLLOWS W/ 755           <====
     010232                     DNM03C:
     010232  012742  000221              MOV     #221,-(R2)      ;MOVE TO MAILBOX #  *******  221  *******
     010236  005242                      INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     010240  000000                      HALT                    ;DATA INCORRECTLY MODIFIED BY CMP
                                                                 ;  OR SEQUENCE ERROR
1618                                    ;*******************************************************************************
1619                                    ;
```

```
   1620                                        ;        THIS TEST VERIFIES MODE 1 DOP INSTRUCTIONS.  R0 IS SET TO -1
   1621                                        ;AND LOC 0 TO 1.  R4 IS THEN CLEARED AND USED TO POINT TO LOC 0.
   1622                                        ;IN THE ADD MODE 1 INSTRUCTION, LOC 0 IS ADDED TO R0 AND THE
   1623                                        ;RESULTS VERIFIED.
   1624                                        ;
   1625                                        ;*************************************************************************
                                               ;TEST 117        TEST MODE 1 W/ DOP INST.
                                               ;*************************************************************************
        010242  005212                         TST117: INC     (R2)            ;UPDATE TEST NUMBER
        010244  022712  000117                         CMP     #117,(R2)       ;SEQUENCE ERROR?
        010250  001007                                 BNE     TST120-10       ;BR TO ERROR HALT ON SEQ ERROR
   1626 010252  005000                                 CLR     R0              ;R0=0
   1627 010254  005100                                 COM     R0              ;R0=177777
   1628 010256  005004                                 CLR     R4              ;R4=0
   1629 010260  005014                                 CLR     (R4)            ;LOC 0=0
   1630 010262  005214                                 INC     (R4)            ;LOC 0=1
   1631 010264  061400                                 ADD     (R4),R0         ;TRY ADD SOURCE MODE 1
   1632 010266  001404                                 BEQ     TST120
                                                                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                               ;           CONDITIONAL BRANCH INST. AND    <====
                                                                               ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                               ;           WHICH FOLLOWS W/ 770            <====
        010270  012742  000222                         MOV     #222,-(R2)      ;MOVE TO MAILBOX #  *******  222  *******
        010274  005242                                 INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        010276  000000                                 HALT                    ;RESULT OF ADD INCORRECT
                                                                               ;  OR SEQUENCE ERROR
   1633
   1634                                        ;*************************************************************************
   1635                                        ;
   1636                                        ;        THIS TEST VERIFIES MODE 1 DOP BYTE INSTRUCTIONS WHICH ADDRESS
   1637                                        ;EVEN BYTES.  LOC. 0 IS SET TO -1 AND R4 IS CLEARED.  THEN R4 IS
   1638                                        ;SET TO -1 USING A BISB THRU R0 WITH MODE 1.
   1639                                        ;
   1640                                        ;*************************************************************************
                                               ;TEST 120        TEST MODE 1 - EVEN BYTE W/ DOP INSTS.
                                               ;*************************************************************************
        010300  005212                         TST120: INC     (R2)            ;UPDATE TEST NUMBER
        010302  022712  000120                         CMP     #120,(R2)       ;SEQUENCE ERROR?
        010306  001007                                 BNE     TST121-10       ;BR TO ERROR HALT ON SEQ ERROR
   1641 010310  005000                                 CLR     R0              ;R0=0
   1642 010312  005010                                 CLR     (R0)            ;LOC. 0=0
   1643 010314  005110                                 COM     (R0)            ;LOC. 0=177777
   1644 010316  005004                                 CLR     R4              ;R4=0
   1645 010320  151004                                 BISB    (R0),R4         ;TRY MODE 1- EVEN BYTE W/ DOP
   1646 010322  105104                                 COMB    R4              ;R4=0
   1647 010324  001404                                 BEQ     TST121
                                                                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                               ;           CONDITIONAL BRANCH INST. AND    <====
                                                                               ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                               ;           WHICH FOLLOWS W/ 770            <====
        010326  012742  000223                         MOV     #223,-(R2)      ;MOVE TO MAILBOX #  *******  223  *******
        010332  005242                                 INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        010334  000000                                 HALT                    ;RESULT OF BISB IS INCORRECT
                                                                               ;  OR SEQUENCE ERROR
   1648
   1649                                        ;*************************************************************************
   1650                                        ;
```

```
                                    ;       THIS TEST VERIFIES MODE 1 DOP NON-MODIFYING INSTRUCTIONS
                                    ;WHICH ADDRESS EVEN BYTES.  LOC. 0 IS SET TO -1 AND R0 IS CLEARED
                                    ;AND USED AS THE ADDRESSING REGISTER.  R4 IS SET TO 377 AND A
                                    ;MODE 1,0 CMPB INSTRUCTION IS USED THE RESULTS VERIFIED.
                                    ;
                                    ;*****************************************************************************
                                    ;TEST 121        TEST MODE 1 - EVEN BYTE W/ DOP NON-MOD INST
                                    ;*****************************************************************************
010336  005212                      TST121: INC     (R2)            ;UPDATE TEST NUMBER
010340  022712  000121                      CMP     #121,(R2)       ;SEQUENCE ERROR?
010344  001007                              BNE     TST122-10       ;BR TO ERROR HALT ON SEQ ERROR
010346  005000                              CLR     R0              ;R0=0
010350  005010                              CLR     (R0)            ;LOC 0=0
010352  005110                              COM     (R0)            ;LOC 0=177777
010354  005004                              CLR     R4              ;R4=0
010356  105104                              COMB    R4              ;R4=377
010360  121004                              CMPB    (R0),R4         ;TRY MODE 1 - EVEN BYTE W/ DOP NON-MODIFYING
010362  001404                              BEQ     TST122
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 770            <====
010364  012742  000224                      MOV     #224,-(R2)      ;MOVE TO MAILBOX #  *******  224  *******
010370  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
010372  000000                              HALT                    ;RESULT OF CMPB INCORRECT
                                                                    ;  OR SEQUENCE ERROR

                                    ;*****************************************************************************
                                    ;
                                    ;       THIS TEST VERIFIES MODE 1,0 MOVB INSTRUCTIONS
                                    ;WHICH ADDRESS EVEN BYTES.  LOC. 0 IS SET TO 177400. R0 IS CLEARED AND
                                    ;R4 IS SET TO -1.  MOVB ARE USED TO MOVE BYTE 0 TO R4.  THIS
                                    ;VERIFIES THAT THE PROPER BYTE WAS SELECTED AND THAT THE SIGN-X-TEND
                                    ;FUNCTION WITH MODE 0.
                                    ;       THEN LOC. 0 IS COMPLEMENTED AND THE SAME PROCEDURE EXERCISES
                                    ;THE LOGIC FOR COMPLEMENTARY DATA.
                                    ;       THIS TEST EXERCISES UNIQUE MICROCODE.
                                    ;
                                    ;*****************************************************************************
                                    ;TEST 122        TEST MOV INSTRUCTION MODE 1,0 EVEN BYTE
                                    ;*****************************************************************************
010374  005212                      TST122: INC     (R2)            ;UPDATE TEST NUMBER
010376  022712  000122                      CMP     #122,(R2)       ;SEQUENCE ERROR?
010402  001020                              BNE     TST123-10       ;BR TO ERROR HALT ON SEQ ERROR
010404  005000                              CLR     R0              ;R0=0
010406  005010                              CLR     (R0)            ;LOC 0=0
010410  105110                              COMB    (R0)            ;LOC 0=177400
010412  005110                              COM     (R0)
010414  005004                              CLR     R4              ;R4=0
010416  005104                              COM     R4              ;R4=177777
010420  111004                              MOVB    (R0),R4         ;R4=0
010422  005704                              TST     R4              ;CHECK SIGN OF WORD
010424  001404                              BEQ     DOP1
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 766            <====
010426  012742  000225                   MOV     #225,-(R2)        ;MOVE TO MAILBOX #  *******  225  *******
010432  005242                           INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
010434  000000                           HALT                      ;MOVB SHOULD SIGN X-TEND
010436  005110                  DOP1:    COM     (R0)              ;LOC 0=177777
010440  111004                           MOVB    (R0),R4           ;DO MOVB W/ EVEN BYTE
010442  100404                           BMI     TST123
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                   ;           CONDITIONAL BRANCH INST. AND   <====
                                                                   ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                   ;           WHICH FOLLOWS W/ 757           <====
010444  012742  000226                   MOV     #226,-(R2)        ;MOVE TO MAILBOX #  *******  226  *******
010450  005242                           INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
010452  000000                           HALT                      ;MOVB SHOULD SIGN X-TEND
                                                                   ;  OR SEQUENCE ERROR

                                ;*************************************************************************************
                                ;
                                ;
                                ;        THIS TEST VERIFIES MODE 1 DOP INSTRUCTIONS WHICH REFERENCE
                                ;ODD BYTES.  LOC. 0 IS SET TO 177400.  R0 IS SET TO 0 AND R4 IS
                                ;SET TO 1.  THE BISB INSTRUCTION USES THE DATA IN BYTE 1 TO SET BYTE 0.
                                ;THE RESULT IS CHECKED BY INCREMENTING THE WORD (LOC. 0) TO ZERO.
                                ;
                                ;*************************************************************************************
                                ;TEST 123        TEST MODE 1-ODD BYTE W/ DOP INSTS.
                                ;*************************************************************************************
010454  005212                  TST123:  INC     (R2)              ;UPDATE TEST NUMBER
010456  022712  000123                   CMP     #123,(R2)         ;SEQUENCE ERROR?
010462  001010                           BNE     TST124-10         ;BR TO ERROR HALT ON SEQ ERROR
010464  005000                           CLR     R0                ;R0=0
010466  005010                           CLR     (R0)              ;LOC. 0=0
010470  005004                           CLR     R4                ;R4=0
010472  005204                           INC     R4                ;R4=1
010474  105114                           COMB    (R4)              ;LOC. 0=177400
010476  151410                           BISB    (R4),(R0)         ;TRY TO BIS LOW ORDER BITS W/ MODE 1
010500  005210                           INC     (R0)              ;CHECK RESULT
010502  001404                           BEQ     TST124
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                   ;           CONDITIONAL BRANCH INST. AND   <====
                                                                   ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                   ;           WHICH FOLLOWS W/ 767           <====
010504  012742  000227                   MOV     #227,-(R2)        ;MOVE TO MAILBOX #  *******  227  *******
010510  005242                           INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
010512  000000                           HALT                      ;RESULT OF BISB INCORRECT
                                                                   ;  OR SEQUENCE ERROR

                                ;*************************************************************************************
                                ;
                                ;
                                ;        THIS TEST VERIFIES MODE 2 DOP INSTRUCTIONS.  LOC. 0 IS SET TO -1.
                                ;R0 IS CLEARED AND USED AS THE MODE 2 ADDRESSING REGISTER TO MOVE LOC. 0
                                ;TO R7.  THE DATA RESULTS ARE VERIFIED AND THE INCREMENTING OF THE REGISTER
                                ;IS CHECKED.
                                ;
                                ;*************************************************************************************
                                ;TEST 124        TEST MODE 2 W/ DOP INSTS.
                                ;*************************************************************************************
010514  005212                  TST124:  INC     (R2)              ;UPDATE TEST NUMBER
010516  022712  000124                   CMP     #124,(R2)         ;SEQUENCE ERROR?
```

```
010522  001015                    BNE     TST125-10       ;BR TO ERROR HALT ON SEQ ERROR
010524  005000                    CLR     R0              ;R0=0
010526  005010                    CLR     (R0)            ;LOC. 0=0
010530  005110                    COM     (R0)            ;LOC. 0=177777
010532  012004                    MOV     (R0)+,R4        ;TRY MOVE MODE 2,0
010534  005204                    INC     R4              ;CHECK R4
010536  001404                    BEQ     DOP2
                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                          ;            CONDITIONAL BRANCH INST. AND    <====
                                                          ;            REPLACE THE MOVE INSTRUCTION    <====
                                                          ;            WHICH FOLLOWS W/ 771            <====
010540  012742  000230            MOV     #230,-(R2)      ;MOVE TO MAILBOX #  *******  230  *******
010544  005242                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
010546  000000                    HALT                    ;RESULT OF MOV INST INCORRECT
010550  005300            DOP2:   DEC     R0              ;TEST R0 AFTER MODE 2
010552  005300                    DEC     R0
010554  001404                    BEQ     TST125
                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                          ;            CONDITIONAL BRANCH INST. AND    <====
                                                          ;            REPLACE THE MOVE INSTRUCTION    <====
                                                          ;            WHICH FOLLOWS W/ 762            <====
010556  012742  000231            MOV     #231,-(R2)      ;MOVE TO MAILBOX #  *******  231  *******
010562  005242                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
010564  000000                    HALT                    ;REGISTER NOT INCREMENTED IN MODE 2
                                                          ;  OR SEQUENCE ERROR


                          ;*******************************************************************************
                          ;
                          ;       THIS TEST VERIFIES MODE 2 DOP BYTE INSTRUCTIONS WHICH ADDRESS
                          ;EVEN BYTES.  LOC. 0 IS SET TO -1.  R0 IS CLEARED AND USED AS THE
                          ;ADDRESSING REGISTER IN A TEST WHICH TRIES TO CLEAR BYTE 1 USING
                          ;BYTE 0 DATA AND A BICB.  UNIQUE IN THIS TEST IS USE OF THE
                          ;SAME ADDRESSING REGISTER FOR BOTH SOURCE AND DESTINATION.  THE SOURCE AND
                          ;DESTINATION IS CHECKED TO INSURE PROPER FUNCTIONING.
                          ;
                          ;*******************************************************************************
                          ;TEST 125        TEST MODE 2 - EVEN BYTE W/ DOP INST.
                          ;*******************************************************************************
010566  005212            TST125: INC     (R2)            ;UPDATE TEST NUMBER
010570  022712  000125            CMP     #125,(R2)       ;SEQUENCE ERROR?
010574  001016                    BNE     TST126-10       ;BR TO ERROR HALT ON SEQ ERROR
010576  005000                    CLR     R0              ;R0=0
010600  010010                    MOV     R0,(R0)         ;LOC. 0=0
010602  005110                    COM     (R0)            ;LOC. 0=177777
010604  142010                    BICB    (R0)+,(R0)      ;TRY TO CLEAR BYTE 1 FROM BYTE 0 W/ BICB
010606  105737  000001            TSTB    @#1             ;CHECK RESULT
010612  001404                    BEQ     DOPB2A
                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                          ;            CONDITIONAL BRANCH INST. AND    <====
                                                          ;            REPLACE THE MOVE INSTRUCTION    <====
                                                          ;            WHICH FOLLOWS W/ 770            <====
010614  012742  000232            MOV     #232,-(R2)      ;MOVE TO MAILBOX #  *******  232  *******
010620  005242                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
010622  000000                    HALT                    ;BICB DESTINATION INCORRECT
010624  105137  000000    DOPB2A: COMB    @#0             ;CHECK BICB SOURCE
010630  001404                    BEQ     TST126
                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;              CONDITIONAL BRANCH INST. AND    <====
                                                                        ;              REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;              WHICH FOLLOWS W/ 761            <====
        010632  012742  000233                  MOV     #233,-(R2)      ;MOVE TO MAILBOX #  *******  233  *******
        010636  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        010640  000000                          HALT                    ;BICB SOURCE INCORRECTLY CHANGED
                                                                        ;  OR SEQUENCE ERROR
   1743                                 ;*******************************************************************************
   1744                                 ;
   1745                                 ;       THIS TEST VERIFIES MODE 2 DOP BYTE INSTRUCTIONS WHICH REFERENCE
   1746                                 ;ODD BYTES.  R0 IS SET TO 1, LOC. 0 IS SET TO 177400, AND R4 IS CLEARED.
   1747                                 ;A MODE 2 MOVB USES R0 TO MOVE BYTE 1 TO R4.  AN INCREMENT
   1748                                 ;IS USED TO CHECK THAT THE PROPER BYTE WAS MOVED AND SIGN X-TENDED.
   1749                                 ;
   1750                                 ;*******************************************************************************
                                        ;TEST 126       TEST MODE 2 - ODD BYTE W/ DOP INST.
                                        ;*******************************************************************************
        010642  005212                  TST126: INC     (R2)            ;UPDATE TEST NUMBER
        010644  022712  000126                  CMP     #126,(R2)       ;SEQUENCE ERROR?
        010650  001017                          BNE     TST127-10       ;BR TO ERROR HALT ON SEQ ERROR
   1751 010652  005000                          CLR     R0              ;R0=0
   1752 010654  005004                          CLR     R4              ;R4=0
   1753 010656  005010                          CLR     (R0)            ;LOC. 0=0
   1754 010660  005110                          COM     (R0)            ;LOC. 0=177777
   1755 010662  105120                          COMB    (R0)+           ;LOC 0=177400; R0=1
   1756 010664  112004                          MOVB    (R0)+,R4        ;TRY DOP MODE 2 W/ ODD BYTE
   1757 010666  005204                          INC     R4              ;CHECK RESULT OF MOVB
   1758 010670  001404                          BEQ     DOPB2B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;              CONDITIONAL BRANCH INST. AND    <====
                                                                        ;              REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;              WHICH FOLLOWS W/ 767            <====
        010672  012742  000234                  MOV     #234,-(R2)      ;MOVE TO MAILBOX #  *******  234  *******
        010676  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        010700  000000                          HALT                    ;RESULT OF MOVB INCORRECT
   1759 010702  005740                  DOPB2B: TST     -(R0)           ;BUMP R0 DOWN BY 2
   1760 010704  005700                          TST     R0              ;CHECK R0
   1761 010706  001404                          BEQ     TST127
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;              CONDITIONAL BRANCH INST. AND    <====
                                                                        ;              REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;              WHICH FOLLOWS W/ 760            <====
        010710  012742  000235                  MOV     #235,-(R2)      ;MOVE TO MAILBOX #  *******  235  *******
        010714  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        010716  000000                          HALT                    ;MODE 2 BYTE DID NOT INCREMENT REG. CORRECTLY
                                                                        ;  OR SEQUENCE ERROR
   1762                                 ;*******************************************************************************
   1763                                 ;
   1764                                 ;       THIS TEST VERIFIES MODE 3 DOUBLE-OPERAND INSTRUCTIONS.
   1765                                 ;LOC. 0 IS LOADED WITH ALTERNATING ZEROES AND ONES; AND R0 IS LOADED
   1766                                 ;WITH ALTERNATING ONES AND ZEROES.  A MODE 3 BIS IS USED TO SET R0
   1767                                 ;TO -1 BY USING LOC. 0 AS THE SOURCE TO BIS THE ZEROES IN R0.  THE
   1768                                 ;RESULT IS TESTED BY INCREMENTING R0 AND CHECKING FOR ZERO.
   1769                                 ;
   1770                                 ;*******************************************************************************
                                        ;TEST 127       TEST MODE 3 W/ DOP INSTS.
                                        ;*******************************************************************************
```

```
     010720  005212                          TST127: INC     (R2)            ;UPDATE TEST NUMBER
     010722  022712  000127                          CMP     #127,(R2)       ;SEQUENCE ERROR?
     010726  001011                                  BNE     TST130-10       ;BR TO ERROR HALT ON SEQ ERROR
     010730  012737  052525  000000                  MOV     #052525,@#0     ;MOVE 52525 TO LOC. 0
     010736  012700  125252                          MOV     #125252,R0      ;SET ALT. ONE AND ZERO IN R0
     010742  053700  000000                          BIS     @#0,R0          ;TRY TO SET ALL OTHER BITS W/ MODE 3
     010746  005200                                  INC     R0              ;TEST RESULT
     010750  001404                                  BEQ     TST130
                                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                             ;           CONDITIONAL BRANCH INST. AND    <====
                                                                             ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                             ;           WHICH FOLLOWS W/ 766            <====
     010752  012742  000236                          MOV     #236,-(R2)      ;MOVE TO MAILBOX #  *******  236  *******
     010756  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     010760  000000                                  HALT                    ;BIS W/ MODE 3 INCORRECT RESULT
                                                                             ;  OR SEQUENCE ERROR
                                             ;*************************************************************************
                                             ;
                                             ;       THIS TEST VERIFIES MODE 3 DOUBLE OPERAND BYTE INSTRUCTIONS WHICH
                                             ;ADDRESS EVEN BYTES.  BYTE 0 IS SET TO ALTERNATING 1'S AND 0'S; BYTE 1,
                                             ;ALTERNATING 0'S AND 1'S.  R0 IS CLEARED AND A BISB IS USED TO
                                             ;SET THE LOW BYTE OF R0 TO 252.
                                             ;
                                             ;*************************************************************************
                                             ;TEST 130        TEST MODE 3 - EVEN BYTE W/ DOP INSTS.
                                             ;*************************************************************************
     010762  005212                          TST130: INC     (R2)            ;UPDATE TEST NUMBER
     010764  022712  000130                          CMP     #130,(R2)       ;SEQUENCE ERROR?
     010770  001011                                  BNE     TST131-10       ;BR TO ERROR HALT ON SEQ ERROR
     010772  012737  052652  000000                  MOV     #52652,@#0      ;NOVE 1'S AND 0' PATTERN TO LOC. 0
     011000  005000                                  CLR     R0              ;R0=0
     011002  153700  000000                          BISB    @#0,R0          ;TRY R0=252 W/ MODE 3 - EVEN BYTE
     011006  022700  000252                          CMP     #252,R0         ;BISB W/ EVEN BYTE SUCCESSFUL?
     011012  001404                                  BEQ     TST131
                                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                             ;           CONDITIONAL BRANCH INST. AND    <====
                                                                             ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                             ;           WHICH FOLLOWS W/ 766            <====
     011014  012742  000237                          MOV     #237,-(R2)      ;MOVE TO MAILBOX #  *******  237  *******
     011020  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     011022  000000                                  HALT                    ;BISB W/ MODE 3 - EVEN BYTE FAILED
                                                                             ;  OR SEQUENCE ERROR
                                             ;*************************************************************************
                                             ;
                                             ;       THIS TEST VERIFIES MODE 3 DOUBLE OPERAND BYTE INSTRUCTIONS
                                             ;WHICH ADDRESS ODD BYTES.  THE SAME PROCEDURE USED IN PREVIOUS
                                             ;TEST IS USED HERE.  THIS TIME BYTE 1 IS USED AS THE SOURCE BYTE.
                                             ;THE EXPECTED RESULT IS:  R0 = 125.
                                             ;
                                             ;*************************************************************************
                                             ;TEST 131        TEST MODE 3 - ODD BYTE W/ DOP INSTS.
                                             ;*************************************************************************
     011024  005212                          TST131: INC     (R2)            ;UPDATE TEST NUMBER
     011026  022712  000131                          CMP     #131,(R2)       ;SEQUENCE ERROR?
     011032  001011                                  BNE     TST132-10       ;BR TO ERROR HALT ON SEQ ERROR
     011034  012737  052652  000000                  MOV     #52652,@#0      ;MOVE 1'S AND 0'S PATTERN TO LOC 0
     011042  005000                                  CLR     R0              ;R0=0
```

```
1799 011044  153700  000001                  BISB    @#1,R0           ;TRY R0=152 W/ MODE 3 - ODD BYTE
1800 011050  022700  000125                  CMP     #125,R0          ;R0=125?
1801 011054  001404                          BEQ     TST132
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 766            <====
     011056  012742  000240                  MOV     #240,-(R2)       ;MOVE TO MAILBOX #  *******  240  *******
     011062  005242                          INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     011064  000000                          HALT                     ;BISB W/ MODE 3 - ODD BYTE FAILED
                                                                      ;  OR SEQUENCE ERROR
1802
1803                                 ;************************************************************************************
                                     ;TEST 132       TEST DEST. MODE 0-BYTE W/ DOP NON-MODIFYING MST
                                     ;************************************************************************************
     011066  005212                  TST132: INC     (R2)             ;UPDATE TEST NUMBER
     011070  022712  000132                  CMP     #132,(R2)        ;SEQUENCE ERROR?
     011074  001017                          BNE     TST133-10        ;BR TO ERROR HALT ON SEQ ERROR
1804 011076  005000                          CLR     R0               ;R0=0
1805 011100  105100                          COMB    R0               ;R0=377
1806 011102  000263                          +SEC!SEV                 ;SET C AND V BITS
1807 011104  132700  000200                  BITB    #200,R0          ;TRY DOPNM DEST. MODE 0-BYTE
1808 011110  001403                          BEQ     DNMB0A           ;BR TO ERROR IF Z BIT SET
1809 011112  102402                          BVS     DNMB0A           ;BR TO ERROR IF V BIT SET
1810 011114  103001                          BCC     DNMB0A           ;BR TO ERROR IF C BIT CLEAR.
1811 011116  100404                          BMI     DNMB0B
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 766            <====
     011120                          DNMB0A:
     011120  012742  000241                  MOV     #241,-(R2)       ;MOVE TO MAILBOX #  *******  241  *******
     011124  005242                          INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     011126  000000                          HALT                     ;CC'S INCORRECT
1812 011130  105100                  DNMB0B: COMB    R0               ;CHECK DESTINATION DATA
1813 011132  001404                          BEQ     TST133
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 760            <====
     011134  012742  000242                  MOV     #242,-(R2)       ;MOVE TO MAILBOX #  *******  242  *******
     011140  005242                          INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     011142  000000                          HALT                     ;DEST. DATA MODIFIED
                                                                      ;  OR SEQUENCE ERROR
1814
1815                                 ;************************************************************************************
                                     ;TEST 133       TEST DEST. MODE 1 W/ DOP NON-MODIFYING INST
                                     ;************************************************************************************
     011144  005212                  TST133: INC     (R2)             ;UPDATE TEST NUMBER
     011146  022712  000133                  CMP     #133,(R2)        ;SEQUENCE ERROR?
     011152  001017                          BNE     TST134-10        ;BR TO ERROR HALT ON SEQ ERROR
1816 011154  005000                          CLR     R0               ;R0=0
1817 011156  005010                          CLR     (R0)             ;LOC. 0=0
1818 011160  000241                          CLC                      ;CLEAR C BIT
1819 011162  032710  177777                  BIT     #177777,(R0)     ;TRY DOPNM DEST. MODE 1
1820 011166  100403                          BMI     DNM1A            ;BR TO ERROR IF N BIT SET
1821 011170  102402                          BVS     DNM1A            ;BR TO ERROR IF V BIT SET
```

```
   1822 011172  103401                          BCS     DNM1A           ;BR TO ERROR IF C BIT SET
   1823 011174  001404                          BEQ     DNM1B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 766             <====
        011176                          DNM1A:
        011176  012742  000243                  MOV     #243,-(R2)      ;MOVE TO MAILBOX #  *******  243  *******
        011202  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        011204  000000                          HALT                    ;COND. CODES INCORRECT
   1824 011206  005710                  DNM1B:  TST     (R0)            ;CHECK TEST DATA
   1825 011210  001404                          BEQ     TST134
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 760             <====
        011212  012742  000244                  MOV     #244,-(R2)      ;MOVE TO MAILBOX #  *******  244  *******
        011216  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        011220  000000                          HALT                    ;DESTINATION DATA MODIFIED
                                                                        ;  OR SEQUENCE ERROR
   1826
   1827                                 ;*******************************************************************************
                                        ;TEST 134       TEST DEST, MODE 2 W/ DOP NON-MODIFYING INST.
                                        ;*******************************************************************************
        011222  005212                  TST134: INC     (R2)            ;UPDATE TEST NUMBER
        011224  022712  000134                  CMP     #134,(R2)       ;SEQUENCE ERROR?
        011230  001027                          BNE     TST135-10       ;BR TO ERROR HALT ON SEQ ERROR
   1828 011232  005000                          CLR     R0              ;R0=0
   1829 011234  005010                          CLR     (R0)            ;LOC. 0=0
   1830 011236  052710  125252                  BIS     #125252,(R0)    ;LOC. 0=125252
   1831 011242  032720  077777                  BIT     #77777,(R0)+    ;TRY DOPNM INST W/ MODE 2
   1832 011246  102402                          BVS     DNM2A           ;BR TO ERROR IF V BIT SET
   1833 011250  001401                          BEQ     DNM2A           ;BR TO ERROR IF Z-BIT SET
   1834 011252  100004                          BPL     DNM2B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 766             <====
        011254                          DNM2A:
        011254  012742  000245                  MOV     #245,-(R2)      ;MOVE TO MAILBOX #  *******  245  *******
        011260  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        011262  000000                          HALT                    ;COND. CODES INCORRECT
   1835 011264  005300                  DNM2B:  DEC     R0              ;DECREMENT R0 TO CHECK IT.
   1836 011266  005300                          DEC     R0
   1837 011270  001404                          BEQ     DNM2D
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 757             <====
        011272                          DNM2C:
        011272  012742  000246                  MOV     #246,-(R2)      ;MOVE TO MAILBOX #  *******  246  *******
        011276  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        011300  000000                          HALT                    ;MODE 2 REGISTER NOT INCREMENTED BY 2
   1838 011302  022710  125252          DNM2D:  CMP     #125252,(R0)    ;CHECK DEST. DATA
   1839 011306  001404                          BEQ     TST135
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                ;               REPLACE THE MOVE INSTRUCTION    <====
                                                ;               WHICH FOLLOWS W/ 750            <====
     011310  012742  000247        MOV    #247,-(R2)    ;MOVE TO MAILBOX #  *******  247  *******
     011314  005242                INC    -(R2)         ;SET MSGTYP TO FATAL ERROR
     011316  000000                HALT                 ;DEST. DATA MODIFIED
                                                        ;  OR SEQUENCE ERROR


                           ;*****************************************************************************
                           ;TEST 135        TEST DEST. MODE 2-BYTE, W/DOP NON-MODIFYING INST
                           ;*****************************************************************************
     011320  005212        TST135: INC    (R2)          ;UPDATE TEST NUMBER
     011322  022712  000135        CMP    #135,(R2)     ;SEQUENCE ERROR?
     011326  001051                BNE    TST136-10     ;BR TO ERROR HALT ON SEQ ERROR
     011330  005000                CLR    R0            ;R0=0
     011332  005010                CLR    (R0)          ;LOC. 0=0
     011334  052710  052652        BIS    #52652,(R0)   ;LOC. 0=52652
     011340  000263                +SEC!SEV             ;SET C AND V BITS
     011342  132720  000201        BITB   #201,(R0)+    ;TRY DOPNM INST. W/ MODE 2 EVEN BYTE
     011346  001403                BEQ    DNMB2A        ;BR TO ERROR IF Z-BIT SET
     011350  103002                BCC    DNMB2A        ;BR TO ERROR IF C-BIT CLEAR
     011352  102401                BVS    DNMB2A        ;BR TO ERROR IF V-BIT SET
     011354  100404                BMI    DNMB2B
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                        ;           WHICH FOLLOWS W/ 764            <====
     011356                DNMB2A:
     011356  012742  000250        MOV    #250,-(R2)    ;MOVE TO MAILBOX #  *******  250  *******
     011362  005242                INC    -(R2)         ;SET MSGTYP TO FATAL ERROR
     011364  000000                HALT                 ;COND. CODES INCORRECT
     011366  005300        DNMB2B: DEC    R0            ;CHECK DEST. REGISTER.
     011370  001404                BEQ    DNMB2C
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                        ;           WHICH FOLLOWS W/ 756            <====
     011372  012742  000251        MOV    #251,-(R2)    ;MOVE TO MAILBOX #  *******  251  *******
     011376  005242                INC    -(R2)         ;SET MSGTYP TO FATAL ERROR
     011400  000000                HALT                 ;DEST. REGISTER NOT INCREMENTED BY 1
     011402  005200        DNMB2C: INC    R0            ;R0=1
     011404  132720  000201        BITB   #201,(R0)+    ;TRY DOPNM INST. W/MODE 2-ODD BYTE
     011410  001402                BEQ    DNMB2D  ;BR TO ERROR IF Z-BIT SET
     011412  102401                BVS    DNMB2D        ;BR TO ERROR IF V-BIT SET
     011414  100004                BPL    DNMB2E
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                        ;           WHICH FOLLOWS W/ 744            <====
     011416                DNMB2D:
     011416  012742  000252        MOV    #252,-(R2)    ;MOVE TO MAILBOX #  *******  252  *******
     011422  005242                INC    -(R2)         ;SET MSGTYP TO FATAL ERROR
     011424  000000                HALT                 ;COND. CODES INCORRECT
     011426  005300        DNMB2E: DEC    R0            ;DEC R0 TO CHECK IT.
     011430  005300                DEC    R0
     011432  001404                BEQ    DNMB2F
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;               WHICH FOLLOWS W/ 735            <====
       011434  012742  000253                 MOV      #253,-(R2)     ;MOVE TO MAILBOX #  *******  253  *******
       011440  005242                         INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
       011442  000000                         HALT                    ;DEST. REGISTER NOT INCREMENTED BY 1
  1861 011444  022710  052652        DNMB2F:  CMP      #52652,(R0)    ;CHECK DEST. DATA IS UNMODIFIED
  1862 011450  001404                         BEQ      TST136
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                      ;               CONDITIONAL BRANCH INST. AND    <====
                                                                      ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;               WHICH FOLLOWS W/ 726            <====
       011452  012742  000254                 MOV      #254,-(R2)     ;MOVE TO MAILBOX #  *******  254  *******
       011456  005242                         INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
       011460  000000                         HALT                    ;DEST. DATA WAS MODIFIED.
                                                                      ;  OR SEQUENCE ERROR
  1863
  1864
  1865                               ;*****************************************************************************************
                                     ;TEST 136        TEST DEST. MODE 3-BYTES W/DOP NON-MODIFYING INST.
                                     ;*****************************************************************************************
       011462  005212                TST136:  INC      (R2)           ;UPDATE TEST NUMBER
       011464  022712  000136                 CMP      #136,(R2)      ;SEQUENCE ERROR?
       011470  001050                         BNE      TST137-10      ;BR TO ERROR HALT ON SEQ ERROR
  1866 011472  005000                         CLR      R0             ;R0=0
  1867 011474  005010                         CLR      (R0)           ;LOC. 0=0
  1868 011476  052710  125125                 BIS      #125125,(R0)   ;LOC. 0=125125
  1869 011502  105100                         COMB     R0             ;R0=377
  1870 011504  005200                         INC      R0             ;R0=400
  1871 011506  005010                         CLR      (R0)           ;LOC. 400=0
  1872 011510  000263                         +SEC!SEV                ;C-BIT=V-BIT=1
  1873 011512  132730  000201                 BITB     #201,@(R0)+    ;TRY DOPNM W/MODE 3-EVEN BYTE
  1874 011516  001403                         BEQ      DNMB3A         ;BR TO ERROR IF Z BIT SET
  1875 011520  102402                         BVS      DNMB3A         ;BR TO ERROR IF V BIT SET
  1876 011522  103001                         BCC      DNMB3A         ;BR TO ERROR IF C BIT CLEAR
  1877 011524  100004                         BPL      DNMB3B
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                      ;               CONDITIONAL BRANCH INST. AND    <====
                                                                      ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;               WHICH FOLLOWS W/ 761            <====
       011526                        DNMB3A:
       011526  012742  000255                 MOV      #255,-(R2)     ;MOVE TO MAILBOX #  *******  255  *******
       011532  005242                         INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
       011534  000000                         HALT                    ;COND. CODES INCORRECT
  1878 011536  022700  000402        DNMB3B:  CMP      #402,R0        ;CHECK DEST. REGISTER INC. BY 2 AND INC BY 2 AGAIN
  1879 011542  001404                         BEQ      DNMB3C
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                      ;               CONDITIONAL BRANCH INST. AND    <====
                                                                      ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;               WHICH FOLLOWS W/ 752            <====
       011544  012742  000256                 MOV      #256,-(R2)     ;MOVE TO MAILBOX #  *******  256  *******
       011550  005242                         INC      -(R2)          ;SET MSGTYP TO FATAL ERROR
       011552  000000                         HALT                    ;DEST. REGISTER NOT INCREMENTED BY 2
  1880 011554  005200                DNMB3C:  INC      R0             ;R0=404
  1881 011556  005200                         INC      R0
  1882 011560  132730  000201                 BITB     #201,@(R0)+    ;TRY DOPNM DEST MODE 3-BYTE(ODD)
  1883 011564  001402                         BEQ      DNMB3D         ;BR TO ERROR IF Z BIT SET
  1884 011566  102401                         BVS      DNMB3D         ;BR TO ERROR IF V BIT SET
  1885 011570  100404                           BMI     DNMB3E
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 737             <====
       011572                           DNMB3D:
       011572  012742  000257                   MOV     #257,-(R2)      ;MOVE TO MAILBOX #  *******  257  *******
       011576  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       011600  000000                           HALT                    ;COND. CODES INCORRECT
  1886 011602  005004                   DNMB3E: CLR     R4              ;R4=0
  1887 011604  022714  125125                   CMP     #125125,(R4)    ;CHECK DEST. DATA
  1888 011610  001404                           BEQ     TST137
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 727             <====
       011612  012742  000260                   MOV     #260,-(R2)      ;MOVE TO MAILBOX #  *******  260  *******
       011616  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       011620  000000                           HALT                    ;DEST. DATA MODIFIED
                                                                        ;  OR SEQUENCE ERROR
  1889
  1890                                  ;*************************************************************************
                                        ;TEST 137        TEST DEST. MODE 4 W/DOP NON-MODIFYING INST.
                                        ;*************************************************************************
       011622  005212                   TST137: INC     (R2)            ;UPDATE TEST NUMBER
       011624  022712  000137                   CMP     #137,(R2)       ;SEQUENCE ERROR?
       011630  001033                           BNE     TST140-10       ;BR TO ERROR HALT ON SEQ ERROR
  1891 011632  005000                           CLR     R0              ;R0=0
  1892 011634  005010                           CLR     (R0)            ;LOC. 0=0
  1893 011636  052710  125252                   BIS     #125252,(R0)    ;LOC. 0=125125
  1894 011642  052700  000002                   BIS     #2,R0           ;R0=2
  1895 011646  000277                           SCC                     ;SET ALL COND. CODE BITS
  1896 011650  032740  020000                   BIT     #20000,-(R0)    ;TRY DOPNM W/ MODE 4
  1897 011654  100403                           BMI     DNM4A           ;BR TO ERROR IF N-BIT SET
  1898 011656  102402                           BVS     DNM4A           ;BR TO ERROR IF V-BIT SET
  1899 011660  103001                           BCC     DNM4A           ;BR TO ERROR IF C-BIT CHAR
  1900 011662  001004                           BNE     DNM4B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 762             <====
       011664                           DNM4A:
       011664  012742  000261                   MOV     #261,-(R2)      ;MOVE TO MAILBOX #  *******  261  *******
       011670  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       011672  000000                           HALT                    ;COND. CODES INCORRECT
  1901 011674  005700                   DNM4B:  TST     R0              ;CHECK DEST. REGISTER
  1902 011676  001404                           BEQ     DNM4C
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 754             <====
       011700  012742  000262                   MOV     #262,-(R2)      ;MOVE TO MAILBOX #  *******  262  *******
       011704  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       011706  000000                           HALT                    ;DEST. REGISTER NOT DECREMENTED BY 2
  1903 011710  022737  125252  000000   DNM4C:  CMP     #125252,@#0     ;CHECK DEST. DATA
  1904 011716  001404                           BEQ     TST140
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                             ;                   CONDITIONAL BRANCH INST. AND      <====
                                                             ;                   REPLACE THE MOVE INSTRUCTION      <====
                                                             ;                   WHICH FOLLOWS W/ 744              <====
     011720  012742  000263                MOV     #263,-(R2)     ;MOVE TO MAILBOX #  *******  263  *******
     011724  005242                        INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     011726  000000                        HALT                   ;DEST. DATA MODIFIED
                                                             ;  OR SEQUENCE ERROR


                                  ;*******************************************************************************
                                  ;TEST 140        TEST DEST. MODE 4-BYTE W/ DOP NON-MODIFYING INST.
                                  ;*******************************************************************************
     011730  005212               TST140: INC     (R2)           ;UPDATE TEST NUMBER
     011732  022712  000140                CMP     #140,(R2)      ;SEQUENCE ERROR?
     011736  001051                        BNE     TST141-10      ;BR TO ERROR HALT ON SEQ ERROR
     011740  005000                        CLR     R0             ;R0=0
     011742  005010                        CLR     (R0)           ;LOC. 0=0
     011744  052710  052652                BIS     #52652,(R0)    ;LOC. 0=52652
     011750  052700  000002                BIS     #2,R0          ;R0=2
     011754  000257                        CCC                    ;COND. CODES=0
     011756  132740  000201                BITB    #201,-(R0)     ;TRY DOPNM INST W/MODE 4 ODD BYTE
     011762  102403                        BVS     DNMB4A         ;BR TO ERROR IF V BIT SET
     011764  001402                        BEQ     DNMB4A  ;BR TO ERROR IF Z BIT SET
     011766  103401                        BCS     DNMB4A         ;BR TO ERROR IF C BIT SET
     011770  001004                        BNE     DNMB4B
                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                             ;           CONDITIONAL BRANCH INST. AND      <====
                                                             ;           REPLACE THE MOVE INSTRUCTION      <====
                                                             ;           WHICH FOLLOWS W/ 762              <====
     011772                       DNMB4A:
     011772  012742  000264                MOV     #264,-(R2)     ;MOVE TO MAILBOX #  *******  264  *******
     011776  005242                        INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     012000  000000                        HALT                   ;COND. CODES INCORRECT
     012002  022700  000001       DNMB4B: CMP     #1,R0          ;CHECK DEST. REGISTER
     012006  001404                        BEQ     DNMB4C
                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                             ;           CONDITIONAL BRANCH INST. AND      <====
                                                             ;           REPLACE THE MOVE INSTRUCTION      <====
                                                             ;           WHICH FOLLOWS W/ 753              <====
     012010  012742  000265                MOV     #265,-(R2)     ;MOVE TO MAILBOX #  *******  265  *******
     012014  005242                        INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     012016  000000                        HALT                   ;DEST REG. NOT DECREMENTED BY 1
     012020  132740  000201       DNMB4C: BITB    #201,-(R0)     ;TRY DOPNM INST. W/MODE 4 EVEN BYTE
     012024  001401                        BEQ     DNMB4D         ;BR TO ERROR IF Z-BIT SET
     012026  100404                        BMI     DNMB4E
                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                             ;           CONDITIONAL BRANCH INST. AND      <====
                                                             ;           REPLACE THE MOVE INSTRUCTION      <====
                                                             ;           WHICH FOLLOWS W/ 743              <====
     012030                       DNMB4D:
     012030  012742  000266                MOV     #266,-(R2)     ;MOVE TO MAILBOX #  *******  266  *******
     012034  005242                        INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     012036  000000                        HALT                   ;COND. CODES INCORRECT
     012040  005700               DNMB4E: TST     R0             ;CHECK DEST. REGISTER
     012042  001404                        BEQ     DNMB4F
                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                             ;           CONDITIONAL BRANCH INST. AND      <====
                                                             ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                    ;           WHICH FOLLOWS W/ 735         <====
     012044  012742  000267                MOV     #267,-(R2)       ;MOVE TO MAILBOX #  *******  267  *******
     012050  005242                        INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     012052  000000                        HALT                     ;DEST. REG. NOT DECREMENTED BY 1
1924 012054  022710  052652        DNMB4F: CMP     #52652,(R0)      ;CHECK DESTINATION DATA
1925 012060  001404                        BEQ     TST141
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 726             <====
     012062  012742  000270                MOV     #270,-(R2)       ;MOVE TO MAILBOX #  *******  270  *******
     012066  005242                        INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     012070  000000                        HALT                     ;DEST. DATA MODIFIED
                                                                    ;  OR SEQUENCE ERROR
1926
1927                                  ;*******************************************************************************************
                                      ;TEST 141         TEST DEST MODE 5 W/DOP NON-MODIFYING INST.
                                      ;*******************************************************************************************
     012072  005212                TST141: INC     (R2)             ;UPDATE TEST NUMBER
     012074  022712  000141                CMP     #141,(R2)        ;SEQUENCE ERROR?
     012100  001034                        BNE     TST142-10        ;BR TO ERROR HALT ON SEQ ERROR
1928 012102  005000                        CLR     R0               ;R0=0
1929 012104  005010                        CLR     (R0)             ;LOC 0=0
1930 012106  052710  100000                BIS     #100000,(R0)     ;LOC. 0=100000
1931 012112  052700  000402                BIS     #402,R0          ;R0=2
1932 012116  000277                        SCC                      ;SET ALL COND. CODE BITS
1933 012120  032750  100000                BIT     #100000,@-(R0)   ;TRY DOPNM W/MODE 5
1934 012124  102403                        BVS     DNM5A            ;BR TO ERROR IF V-BIT SET
1935 012126  103002                        BCC     DNM5A            ;BR TO ERROR IF C-BIT CLEAR
1936 012130  001401                        BEQ     DNM5A            ;BR TO ERROR IF Z-BIT SET
1937 012132  100404                        BMI     DNM5B
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 762             <====
     012134                        DNM5A:
     012134  012742  000271                MOV     #271,-(R2)       ;MOVE TO MAILBOX #  *******  271  *******
     012140  005242                        INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     012142  000000                        HALT                     ;COND, CODES INCORRECT
1938 012144  022700  000400        DNM5B:  CMP #400,R0              ;CHECK DEST. REGISTER
1939 012150  001404                        BEQ     DNM5C
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 753             <====
     012152  012742  000272                MOV     #272,-(R2)       ;MOVE TO MAILBOX #  *******  272  *******
     012156  005242                        INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     012160  000000                        HALT                     ;DEST. REGISTER NOT DECREMENTED BY 2
1940 012162  022737  100000  000000 DNM5C: CMP     #100000,@#0      ;CHECK DESTINATION DATA
1941 012170  001404                        BEQ     TST142
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 743             <====
     012172  012742  000273                MOV     #273,-(R2)       ;MOVE TO MAILBOX #  *******  273  *******
     012176  005242                        INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     012200  000000                        HALT                     ;DEST. DATA INCORRECTLY MODIFIED
```

```
                                                                ;  OR SEQUENCE ERROR
 1942
 1943                                            ;*******************************************************************************
                                                 ;TEST 142       TEST DEST. MODE 6 W/DOP NON-MODIFYING INST.
                                                 ;*******************************************************************************
      012202  005212                             TST142: INC     (R2)            ;UPDATE TEST NUMBER
      012204  022712  000142                             CMP     #142,(R2)       ;SEQUENCE ERROR?
      012210  001033                                     BNE     TST143-10       ;BR TO ERROR HALT ON SEQ ERROR
 1944 012212  005000                                     CLR     R0              ;R0=0
 1945 012214  005010                                     CLR     (R0)            ;LOC> 0=0
 1946 012216  052710  000001                             BIS     #1,(R0)         ;LOC. 0=1
 1947 012222  005100                                     COM     R0              ;R0=-1 C-BIT=1
 1948 012224  032760  000001  000001                     BIT     #1,1(R0)        ;TRY DOPNM W/MODE 6
 1949 012232  001403                                     BEQ     DNM6A           ;BR TO ERROR IF Z-BIT SET
 1950 012234  102402                                     BVS     DNM6A           ;BR TO ERROR IF V-BIT SET
 1951 012236  103001                                     BCC     DNM6A           ;BR TO ERROR IF C-BIT CLEAR
 1952 012240  100004                                     BPL     DNM6B
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                         ;           CONDITIONAL BRANCH INST. AND     <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                         ;           WHICH FOLLOWS W/ 763             <====
      012242                                     DNM6A:
      012242  012742  000274                             MOV     #274,-(R2)      ;MOVE TO MAILBOX #  *******  274  *******
      012246  005242                                     INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      012250  000000                                     HALT                    ;COND CODES INCORRECT
 1953 012252  022700  177777                     DNM6B:  CMP     #-1,R0          ;CHECK DEST. REGISTER
 1954 012256  001404                                     BEQ     DNM6C
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                         ;           CONDITIONAL BRANCH INST. AND     <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                         ;           WHICH FOLLOWS W/ 754             <====
      012260  012742  000275                             MOV     #275,-(R2)      ;MOVE TO MAILBOX #  *******  275  *******
      012264  005242                                     INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      012266  000000                                     HALT                    ;DEST. REGISTER MODIFIED
 1955 012270  022737  000001  000000             DNM6C:  CMP     #1,@#0          ;CHECK DEST. DATA
 1956 012276  001404                                     BEQ     TST143
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                         ;           CONDITIONAL BRANCH INST. AND     <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                         ;           WHICH FOLLOWS W/ 744             <====
      012300  012742  000276                             MOV     #276,-(R2)      ;MOVE TO MAILBOX #  *******  276  *******
      012304  005242                                     INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      012306  000000                                     HALT                    ;DEST. DATA MODIFIED
                                                                                 ;  OR SEQUENCE ERROR
 1957
 1958                                            ;*******************************************************************************
                                                 ;TEST 143       TEST DEST MODE 7 W/DOP NON-MODIFYING INST.
                                                 ;*******************************************************************************
      012310  005212                             TST143: INC     (R2)            ;UPDATE TEST NUMBER
      012312  022712  000143                             CMP     #143,(R2)       ;SEQUENCE ERROR?
      012316  001034                                     BNE     TST144-10       ;BR TO ERROR HALT ON SEQ ERROR
 1959 012320  005000                                     CLR     R0              ;R0=0
 1960 012322  005010                                     CLR     (R0)            ;LOC. 0=0 C-BIT=0
 1961 012324  052710  125125                             BIS     #125125,(R0)    ;LOC. 0=125125
 1962 012330  052700  000001                             BIS     #1,R0           ;R0=1
 1963 012334  132770  000125  000403                     BITB    #125,@403(R0)   ;TRY DOPNM W/MODE 7
 1964 012342  102403                                     BVS     DNM7A           ;BR TO ERROR IF V-BIT SET
 1965 012344  100402                          BMI     DNM7A             ;BR TO ERROR IF N-BIT SET
 1966 012346  103401                          BCS     DNM7A             ;BR TO ERROR IF C-BIT SET
 1967 012350  001404                          BEQ     DNM7B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 762             <====
      012352                          DNM7A:
      012352  012742  000277                  MOV     #277,-(R2)        ;MOVE TO MAILBOX #  *******  277  *******
      012356  005242                          INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
      012360  000000                          HALT                      ;COND. CODES INCORRECT
 1968 012362  022700  000001          DNM7B:  CMP     #1,R0             ;CHECK DEST. REGISTER
 1969 012366  001404                          BEQ     DNM7C
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 753             <====
      012370  012742  000300                  MOV     #300,-(R2)        ;MOVE TO MAILBOX #  *******  300  *******
      012374  005242                          INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
      012376  000000                          HALT                      ;DESTINATION REGISTER MODIFIED
 1970 012400  022737  125125  000000  DNM7C:  CMP     #125125,@#0       ;CHECK DEST. DATA
 1971 012406  001404                          BEQ     TST144
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 743             <====
      012410  012742  000301                  MOV     #301,-(R2)        ;MOVE TO MAILBOX #  *******  301  *******
      012414  005242                          INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
      012416  000000                          HALT                      ;DEST. DATA INCORRECT
                                                                        ;  OR SEQUENCE ERROR
 1972
 1973                                 ;**************************************************************************************
 1974                                 ;
 1975                                 ;               THIS TEST VERIFIES THE MOV DESTINATION MODE 1 INSTRUCTION.
 1976                                 ;DATA IS SET IN R0 USING SOP INSTRUCTIONS AND THEN MOVED TO LOC. 0
 1977                                 ;USING MOV SRC MODE 0, DEST. MODE 1.
 1978                                 ;
 1979                                 ;**************************************************************************************
                                      ;TEST 144        TEST MOV DESTINATION MODE 1
                                      ;**************************************************************************************
      012420  005212                  TST144: INC     (R2)              ;UPDATE TEST NUMBER
      012422  022712  000144                  CMP     #144,(R2)         ;SEQUENCE ERROR?
      012426  001016                          BNE     TST145-10         ;BR TO ERROR HALT ON SEQ ERROR
 1980 012430  005000                          CLR     R0                ;R0=0
 1981 012432  005010                          CLR     (R0)              ;LOC. 0=0
 1982 012434  005100                          COM     R0                ;R0=-1
 1983 012436  005004                          CLR     R4                ;R4 POINTS TO LOC. 0
 1984 012440  010014                          MOV     R0,(R4)           ;TRY MOVE MODE 0,1
 1985 012442  102402                          BVS     MDM1A             ;BR TO ERROR IF V SET
 1986 012444  001401                          BEQ     MDM1A             ;BR TO ERROR IF Z SET
 1987 012446  100404                          BMI     MDM1B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVF INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 767             <====
      012450                          MDM1A:
      012450  012742  000302                  MOV     #302,-(R2)        ;MOVE TO MAILBOX #  *******  302  *******
```

```
        012454  005242                  INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
        012456  000000                  HALT                            ;CONDITION CODE NOT CORRECT
   1988 012460  005704          MDM1B:  TST     R4
   1989 012462  001404                  BEQ     TST145
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 761             <====
        012464  012742  000303          MOV     #303,-(R2)              ;MOVE TO MAILBOX #  *******  303  *******
        012470  005242                  INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
        012472  000000                  HALT                            ;DESTINATION REGISTER INCORRECTLY ALTERED
                                                                        ;  OR SEQUENCE ERROR
   1990
   1991                         ;*******************************************************************************
   1992                         ;
   1993                         ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 2 INSTRUCTION.
   1994                         ;       DATA IS SET IN R0 USING SOP INSTRUCTIONS AND THEN MOVED
   1995                         ;       TO LOCATION 0 USING MOV SRC MODE 0, DEST. MODE 1.
   1996                         ;
   1997                         ;*******************************************************************************
                                ;TEST 145       TEST MOV DESTINATION MODE 2
                                ;*******************************************************************************
        012474  005212          TST145: INC     (R2)                    ;UPDATE TEST NUMBER
        012476  022712  000145          CMP     #145,(R2)               ;SEQUENCE ERROR?
        012502  001025                  BNE     TST146-10               ;BR TO ERROR HALT ON SEQ ERROR
   1998 012504  005000                  CLR     R0                      ;R0=0
   1999 012506  005010                  CLR     (R0)                    ;LOC.0=0
   2000 012510  005110                  COM     (R0)                    ;LOC. 0=-1
Z  2001 012512  010020                  MOV     R0,(R0)+                ;TRY MOVE MODE 0,2
   2002 012514  100402                  BMI     MDM2A                   ;BR TO ERROR IF N SET
   2003 012516  102401                  BVS     MDM2A                   ;BR TO ERROR IF V SET
   2004 012520  001404                  BEQ     MDM2B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 770             <====
        012522                  MDM2A:
        012522  012742  000304          MOV     #304,-(R2)              ;MOVE TO MAILBOX #  *******  304  *******
        012526  005242                  INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
        012530  000000                  HALT                            ;CC'S INCORRECT
   2005 012532  005300          MDM2B:  DEC     R0
   2006 012534  005300                  DEC     R0
   2007 012536  001404                  BEQ     MDM2D
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 761             <====
        012540                  MDM2C:
        012540  012742  000305          MOV     #305,-(R2)              ;MOVE TO MAILBOX #  *******  305  *******
        012544  005242                  INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
        012546  000000                  HALT                            ;DESTINATION REGISTER NOT INCREMENTED PROPERLY
   2008 012550  005737  000000  MDM2D:  TST     @#0
   2009 012554  001404                  BEQ     TST146
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 752             <====
     012556  012742  000306                   MOV     #306,-(R2)         ;MOVE TO MAILBOX #  *******  306   *******
     012562  005242                           INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     012564  000000                           HALT                       ;DESTINATION DATA INCORRECT
                                                                         ;  OR SEQUENCE ERROR
2010
2011                                 ;*******************************************************************************
2012                                 ;
2013                                 ;        THIS TEST VERIFIES DESTINATION MODE 2 W/MOVB INSTS. TWO DIFFERENT MOVB
2014                                 ;INSTRUCTIONS ARE USED TO MOVE A TEST PATTERN FIRST TO BYTE 0 THEN TO BYTE 1.
2015                                 ;
2016                                 ;*******************************************************************************
                                     ;TEST 146        TEST MOV-BYTE DESTINATION MODE 2
                                     ;*******************************************************************************
     012566  005212                  TST146: INC     (R2)               ;UPDATE TEST NUMBER
     012570  022712  000146                   CMP     #146,(R2)          ;SEQUENCE ERROR?
     012574  001046                           BNE     TST147-10          ;BR TO ERROR HALT ON SEQ ERROR
2017 012576  005000                           CLR     R0                 ;R0=0
2018 012600  005010                           CLR     (R0)               ;LOC. 0=0
2019 012602  112720  000125                   MOVB    #125,(R0)+         ;TRY DESTINATION MODE 2 W/EVEN BYTE
2020 012606  102402                           BVS     MBDM2A             ;BR TO ERROR IF V SET
2021 012610  001401                           BEQ     MBDM2A             ;BR TO ERROR IF Z SET
2022 012612  100004                           BPL     MBDM2B
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                         ;           CONDITIONAL BRANCH INST. AND    <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                         ;           WHICH FOLLOWS W/ 770            <====
     012614                          MBDM2A:
     012614  012742  000307                   MOV     #307,-(R2)         ;MOVE TO MAILBOX #  *******  307   *******
     012620  005242                           INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     012622  000000                           HALT                       ;CC'S INCORRECT
2023 012624  022700  000001          MBDM2B:  CMP     #1,R0
2024 012630  001404                           BEQ     MBDM2C
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                         ;           CONDITIONAL BRANCH INST. AND    <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                         ;           WHICH FOLLOWS W/ 761            <====
     012632  012742  000310                   MOV     #310,-(R2)         ;MOVE TO MAILBOX #  *******  310   *******
     012636  005242                           INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     012640  000000                           HALT                       ;REGISTER NOT INCREMENTED BY ONE
2025 012642  112720  000252          MBDM2C:  MOVB    #252,(R0)+         ;TRY DESTINATION MODE 2 W/ODD BYTE
2026 012646  102402                           BVS     MBDM2D
2027 012650  001401                           BEQ     MBDM2D
2028 012652  100404                           BMI     MBDM2E
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                         ;           CONDITIONAL BRANCH INST. AND    <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                         ;           WHICH FOLLOWS W/ 750            <====
     012654                          MBDM2D:
     012654  012742  000311                   MOV     #311,-(R2)         ;MOVE TO MAILBOX #  *******  311   *******
     012660  005242                           INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     012662  000000                           HALT                       ;CC'S NOT SET CORRECT
2029 012664  022700  000002          MBDM2E:  CMP     #2,R0
2030 012670  001404                           BEQ     MBDM2F
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                         ;           CONDITIONAL BRANCH INST. AND    <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                         ;           WHICH FOLLOWS W/ 741            <====
        012672  012742  000312                  MOV     #312,-(R2)      ;MOVE TO MAILBOX #  *******  312  *******
        012676  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        012700  000000                          HALT                    ;REGISTER NOT INCREMENTED BY ONE
   2031 012702  022737  125125  000000  MBDM2F: CMP     #125125,@#0     ;CHECK DATA
   2032 012710  001404                          BEQ     TST147
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 731            <====
        012712  012742  000313                  MOV     #313,-(R2)      ;MOVE TO MAILBOX #  *******  313  *******
        012716  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        012720  000000                          HALT                    ;DESTINATION DATA INCORRECT
                                                                        ;  OR SEQUENCE ERROR
   2033
   2034                                 ;*******************************************************************************
   2035                                 ;
   2036                                 ;       THIS TEST VERIFIES MOV DESTINATION MODE 3. R0 IS USED TO PICK UP
   2037                                 ;AN ADDRESS AT LOC. 400. LOC 400 POINTS TO LOC. 0 THE EFFECTIVE DEST. ADDR.. ALSO, MOVB
   2038                                 ;INST. ARE USED W/ EVEN AND ODD BYTES TO CHECK MOV BYTES INST AND MODE 37 DESTINATIONS.
   2039                                 ;*******************************************************************************
                                        ;TEST 147       TEST MOV(B) DESTINATION MODE 3
                                        ;*******************************************************************************
        012722  005212                  TST147: INC     (R2)            ;UPDATE TEST NUMBER
        012724  022712  000147                  CMP     #147,(R2)       ;SEQUENCE ERROR?
        012730  001057                          BNE     TST150-10       ;BR TO ERROR HALT ON SEQ ERROR
   2040 012732  012700  000400                  MOV     #400,R0         ;R0=400
   2041 012736  005010                          CLR     (R0)            ;LOC. 400 POINTS TO LOC. 0
   2042 012740  005037  000000                  CLR     @#0             ;LOC. 0=0
   2043 012744  012730  125252                  MOV     #125252,@(R0)+  ;TRY MOV DESTINATION MODE 2
   2044 012750  102402                          BVS     MDM3A           ;BR TO ERROR IF V SET
   2045 012752  001401                          BEQ     MDM3A           ;BR TO ERROR IF Z SET
   2046 012754  100404                          BMI     MDM3B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 765            <====
        012756                          MDM3A:
        012756  012742  000314                  MOV     #314,-(R2)      ;MOVE TO MAILBOX #  *******  314  *******
        012762  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        012764  000000                          HALT                    ;CC'S INCORRECT
   2047 012766  022700  000402          MDM3B:  CMP     #402,R0         ;CHECK DEST. MODE REGISTER
   2048 012772  001404                          BEQ     MDM3C
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 756            <====
        012774  012742  000315                  MOV     #315,-(R2)      ;MOVE TO MAILBOX #  *******  315  *******
        013000  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        013002  000000                          HALT                    ;REGISTER NOT INCREMENTED BY 2
   2049 013004  022737  125252  000000  MDM3C:  CMP     #125252,@#0     ;CHECK DESTINATION DATA
   2050 013012  001404                          BEQ     MDM3D
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 746            <====
        013014  012742  000316                  MOV     #316,-(R2)      ;MOVE TO MAILBOX #  *******  316  *******
        013020  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
```

```
      013022  000000                              HALT                    ;DESTINATION DATA INCORRECT
 2051 013024  112737  000125  000000  MDM3D:  MOVB    #125,@#0           ;TRY MOVB DESTINATION MODE Z EVEN BYTE
 2052 013032  022737  125125  000000          CMP     #125125,@#0        ;CHECK DATA
 2053 013040  001404                          BEQ     MDM3E
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                         ;           CONDITIONAL BRANCH INST. AND     <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                         ;           WHICH FOLLOWS W/ 733             <====
      013042  012742  000317                  MOV     #317,-(R2)         ;MOVE TO MAILBOX #  *******  317  *******
      013046  005242                          INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
      013050  000000                          HALT                       ;DESTINATION DATA INCORRECT
 2054 013052  112737  000525  000001  MDM3E:  MOVB    #525,@#1           ;TRY MOVB DESTINATION MODE 2 ODD BYTE
 2055 013060  022737  052525  000000          CMP     #52525,@#0         ;CHECK DATA
 2056 013066  001404                          BEQ     TST150
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                         ;           CONDITIONAL BRANCH INST. AND     <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                         ;           WHICH FOLLOWS W/ 720             <====
      013070  012742  000320                  MOV     #320,-(R2)         ;MOVE TO MAILBOX #  *******  320  *******
      013074  005242                          INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
      013076  000000                          HALT                       ;
 2057
 2058                                 ;*******************************************************************************
 2059                                 ;
 2060                                 ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 4 INSTRUCTION.
 2061                                 ;SOP INSTRUCTIONS ON R0 ARE USED TO CLEAR TARGET LOCATION 0.
 2062                                 ;R4 IS USED AS THE MODE 4 ADDRESSING REGISTER, AND
 2063                                 ;CONDITIONAL BRANCHES ARE USED TO VERIFY THE DATA.
 2064                                 ;
 2065                                 ;*******************************************************************************
                                      ;TEST 150          TEST MOV DESTINATION MODE 4
                                      ;*******************************************************************************
      013100  005212                  TST150: INC     (R2)               ;UPDATE TEST NUMBER
      013102  022712  000150                  CMP     #150,(R2)          ;SEQUENCE ERROR?
      013106  001026                          BNE     TST151-10          ;BR TO ERROR HALT ON SEQ ERROR
 2066 013110  005000                          CLR     R0                 ;R0=0
 2067 013112  005010                          CLR     (R0)               ;LOC 0=0
 2068 013114  012704  000002                  MOV     #2,R4              ;R4=2
 2069 013120  012744  012345                  MOV     #12345,-(R4)       ;TRY MOV DEST. MODE 4
 2070 013124  102402                          BVS     MDM4A              ;BR TO ERROR IF V-BIT SET
 2071 013126  001401                          BEQ     MDM4A              ;BR TO ERROR IF Z-BIT SET
 2072 013130  100004                          BPL     MDM4B
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                         ;           CONDITIONAL BRANCH INST. AND     <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                         ;           WHICH FOLLOWS W/ 766             <====
      013132                          MDM4A:
      013132  012742  000321                  MOV     #321,-(R2)         ;MOVE TO MAILBOX #  *******  321  *******
      013136  005242                          INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
      013140  000000                          HALT                       ;CC'S NOT CORRECT
 2073 013142  005704                  MDM4B:  TST     R4                 ;CHECK DECREMENTING OF MODE 4 REG.
 2074 013144  001404                          BEQ     MDM4C
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                         ;           CONDITIONAL BRANCH INST. AND     <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                         ;           WHICH FOLLOWS W/ 760             <====
      013146  012742  000322                  MOV     #322,-(R2)         ;MOVE TO MAILBOX #  *******  322  *******
```

```
     013152  005242                       INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
     013154  000000                       HALT                      ;DESTINATION MODE REGISTER NOT DECREMENTED BY 2
2075 013156  022710  012345      MDM4C:   CMP     #12345,(R0)       ;CHECK DESTINATION DATA
2076 013162  001404                       BEQ     TST151
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 751             <====
     013164  012742  000323               MOV     #323,-(R2)        ;MOVE TO MAILBOX #  *******  323  *******
     013170  005242                       INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
     013172  000000                       HALT                      ;DESTINATION DATA INCORRECT
                                                                    ;  OR SEQUENCE ERROR
2077
2078                                 ;*******************************************************************************
2079                                 ;
2080                                 ;        THIS TEST VERIFIES THE MOVB DESTINATION MODE 4 INSTRUCTION
2081                                 ;        ON BOTH ODD AND EVEN BYTES. SOP INSTRUCTIONS ON R4 ARE
2082                                 ;        USED TO CLEAR TARGET LOCATION 0. R0 IS USED AS THE MODE 4
2083                                 ;        ADDRESSING REGISTER, AND CMP AND CONDITIONAL BRANCH
2084                                 ;        INSTRUCTIONS ARE USED TO VERIFY THE DATA.
2085                                 ;
2086                                 ;*******************************************************************************
                                     ;TEST 151          TEST MOVB DESTINATION MODE 4
                                     ;*******************************************************************************
     013174  005212                  TST151:  INC     (R2)              ;UPDATE TEST NUMBER
     013176  022712  000151               CMP     #151,(R2)         ;SEQUENCE ERROR?
     013202  001046                       BNE     TST152-10         ;BR TO ERROR HALT ON SEQ ERROR
2087 013204  005004                       CLR     R4                ;R4=0
2088 013206  005014                       CLR     (R4)              ;LOC. 0=0
2089 013210  012700  000002               MOV     #2,R0             ;R0 = 2
2090 013214  112740  125125               MOVB    #125125,-(R0)     ;TRY MOVB DEST. MODE 4-ODD BYTE
2091 013220  020027  000001               CMP     R0,#1             ;CHECK THAT DEST. REG. WAS DECREMENTED
2092 013224  001404                       BEQ     MBDM4A
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 766             <====
     013226  012742  000324               MOV     #324,-(R2)        ;MOVE TO MAILBOX #  *******  324  *******
     013232  005242                       INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
     013234  000000                       HALT                      ;DESTINATION REG. NOT DECREMENTED BY 1
2093 013236  021427  052400      MBDM4A:  CMP     (R4),#52400       ;CHECK DEST. DATA
2094 013242  001404                       BEQ     MBDM4B
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 757             <====
     013244  012742  000325               MOV     #325,-(R2)        ;MOVE TO MAILBOX #  *******  325  *******
     013250  005242                       INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
     013252  000000                       HALT                      ;DEST. DATA NOT CORRECT
2095 013254  112740  125125      MBDM4B:  MOVB    #125125,-(R0)     ;TRY MOVB DEST. MODE 4--EVEN BYTE
2096 013260  102402                       BVS     MBDM4C            ;BR. TO ERROR IF V-BIT SET
2097 013262  001401                       BEQ     MBDM4C            ;BR TO ERROR IF Z-BIT SET
2098 013264  100004                       BPL     MBDM4D
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;           CONDITIONAL BRANCH INST. AND     <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;           WHICH FOLLOWS W/ 746             <====
         013266                                 MBDM4C:
         013266  012742  000326                         MOV     #326,-(R2)      ;MOVE TO MAILBOX #  *******  326  *******
         013272  005242                                 INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
         013274  000000                                 HALT                    ;COND. CODES INCORRECT
    2099 013276  005700                         MBDM4D: TST     R0              ;CHECK MODE 4 DEST. REGISTER
    2100 013300  001404                                 BEQ     MBDM4E
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                                ;           WHICH FOLLOWS W/ 740             <====
         013302  012742  000327                         MOV     #327,-(R2)      ;MOVE TO MAILBOX #  *******  327  *******
         013306  005242                                 INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
         013310  000000                                 HALT                    ;DESTINATION REG NOT DECREMENTED BY 1
    2101 013312  021427  052525                 MBDM4E: CMP     (R4),#52525     ;CHECK DEST. DAT^A
    2102 013316  001404                                 BEQ     TST152
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                                ;           WHICH FOLLOWS W/ 731             <====
         013320  012742  000330                         MOV     #330,-(R2)      ;MOVE TO MAILBOX #  *******  330  *******
         013324  005242                                 INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
         013326  000000                                 HALT                    ;DESTINATION DATA INCORRECT
                                                                                ;  OR SEQUENCE ERROR
    2103
    2104                                        ;*****************************************************************************
    2105                                        ;
    2106                                        ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 5 AND THE MOVB
    2107                                        ;DESTINATION MODE 5 - EVEN BYTE INSTRUCTIONS. R4 IS A
    2108                                        ;POINTER TO TARGET LOCATION 0 AND R0 IS SETUP TO
    2109                                        ;POINT TO LOCATION 376 FOR THE MOV, AND LOCATION 404 FOR
    2110                                        ;THE MOVB INSTRUCTIONS. CMP INSTRUCTIONS ARE USED TO VERIFY
    2111                                        ;PROPER ADDRESSING AND DATA.
    2112                                        ;
    2113                                        ;*****************************************************************************
                                                ;TEST 152        TEST MOV DESTINATION MODE 5
                                                ;*****************************************************************************
         013330  005212                         TST152: INC     (R2)            ;UPDATE TEST NUMBER
         013332  022712  000152                         CMP     #152,(R2)       ;SEQUENCE ERROR?
         013336  001051                                 BNE     TST153-10       ;BR TO ERROR HALT ON SEQ ERROR
    2114 013340  005004                                 CLR     R4              ;R4=0
    2115 013342  005014                                 CLR     (R4)            ;LOC. 0 = 0
    2116 013344  012700  000400                         MOV     #400,R0         ;R0=400
    2117 013350  012750  004321                         MOV     #4321,@-(R0)    ;TRY MOV DEST. MODE 5
    2118 013354  102402                                 BVS     MDM5A           ;BR TO ERROR IF V-BIT SET
    2119 013356  001401                                 BEQ     MDM5A           ;BR TO ERROR IF Z-BIT SET
    2120 013360  100004                                 BPL     MDM5B
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                                ;           WHICH FOLLOWS W/ 766             <====
         013362                                 MDM5A:
         013362  012742  000331                         MOV     #331,-(R2)      ;MOVE TO MAILBOX #  *******  331  *******
         013366  005242                                 INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
         013370  000000                                 HALT                    ;COND. CODES INCORRECT
    2121 013372  022700  000376                 MDM5B:  CMP     #376,R0         ;CHECK MODE 5 REG. WAS DECREMENTED
    2122 013376  001404                                 BEQ     MDM5C
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;                CONDITIONAL BRANCH INST. AND     <====
                                                                       ;                REPLACE THE MOVE INSTRUCTION     <====
                                                                       ;                WHICH FOLLOWS W/ 757             <====
      013400  012742  000332                    MOV     #332,-(R2)     ;MOVE TO MAILBOX #  *******  332  *******
      013404  005242                            INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
      013406  000000                            HALT                   ;MODE 5 REGISTER NOT DECREMENTED BY 2
 2123 013410  022714  004321          MDM5C:    CMP     #4321,(R4)     ;CHECK DEST. DATA
 2124 013414  001404                            BEQ     MDM5D
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS          <====
                                                                       ;                CONDITIONAL BRANCH INST. AND     <====
                                                                       ;                REPLACE THE MOVE INSTRUCTION     <====
                                                                       ;                WHICH FOLLOWS W/ 750             <====
      013416  012742  000333                    MOV     #333,-(R2)     ;MOVE TO MAILBOX #  *******  333  *******
      013422  005242                            INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
      013424  000000                            HALT                   ;DEST. DATA INCORRECT
 2125 013426  012700  000406          MDM5D:    MOV     #406,R0        ;R0=406
 2126 013432  112750  000377                    MOVB    #377,@-(R0)    ;TRY MOV DEST. MODE 5 --EVEN BYTE
 2127 013436  022700  000404                    CMP     #404,R0        ;CHECK MODE 5 REG.
 2128 013442  001404                            BEQ     MDM5E
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS          <====
                                                                       ;                CONDITIONAL BRANCH INST. AND     <====
                                                                       ;                REPLACE THE MOVE INSTRUCTION     <====
                                                                       ;                WHICH FOLLOWS W/ 735             <====
      013444  012742  000334                    MOV     #334,-(R2)     ;MOVE TO MAILBOX #  *******  334  *******
      013450  005242                            INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
      013452  000000                            HALT                   ;MODE 5 REGISTER NOT DECREMENTED BY 2
 2129 013454  022714  177721          MDM5E:    CMP     #177721,(R4)   ;CHECK DEST. DATA
 2130 013460  001404                            BEQ     TST153
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS          <====
                                                                       ;                CONDITIONAL BRANCH INST. AND     <====
                                                                       ;                REPLACE THE MOVE INSTRUCTION     <====
                                                                       ;                WHICH FOLLOWS W/ 726             <====
      013462  012742  000335                    MOV     #335,-(R2)     ;MOVE TO MAILBOX #  *******  335  *******
      013466  005242                            INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
      013470  000000                            HALT                   ;DEST. DATA INCORRECT
                                                                       ;  OR SEQUENCE ERROR
 2131
 2132                                 ;*******************************************************************************
 2133                                 ;
 2134                                 ;        THIS TEST VERIFIES THE MOV DESTINATION MODE 6 AND MOVB - EVEN BYTE
 2135                                 ;DESTINATION MODE 6 INDTRUCTIONS. R0 IS USED TO SETUP TARGET LOC.0
 2136                                 ;FOR BOTH TESTS. PATTERNS OF ONES AND ZEROES ARE MOVED INTO LOC.0
 2137                                 ;BY MODE 6 INSTRUCTIONS, AND CMP INSTRUCTIONS ARE USED TO VERIFY
 2138                                 ;PROPER ADDRESSING AND DATA.
 2139                                 ;
 2140                                 ;*******************************************************************************
                                      ;TEST 153         TEST MOV DESTINATION MODE 6
                                      ;*******************************************************************************
      013472  005212                  TST153:   INC     (R2)           ;UPDATE TEST NUMBER
      013474  022712  000153                    CMP     #153,(R2)      ;SEQUENCE ERROR?
      013500  001054                            BNE     TST154-10      ;BR TO ERROR HALT ON SEQ ERROR
 2141 013502  005000                            CLR     R0             ;R0=0
 2142 013504  005010                            CLR     (R0)           ;LOC. 0=0
 2143 013506  005200                            INC     R0             ;R0=1
 2144 013510  012760  052525  177777           MOV     #052525,-1(R0) ;TRY MOV DEST. MODE 6
 2145 013516  102402                            BVS     MDM6A          ;BR TO ERROR IF V-BIT SET
 2146 013520  001401                            BEQ     MDM6A          ;BR TO ERROR IF Z-BIT SET
```

```
   2147 013522  100004                      BPL     MDM6B
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                ;           CONDITIONAL BRANCH INST. AND       <====
                                                                ;           REPLACE THE MOVE INSTRUCTION       <====
                                                                ;           WHICH FOLLOWS W/ 766               <====
        013524                          MDM6A:
        013524  012742  000336                  MOV     #336,-(R2)      ;MOVE TO MAILBOX #  *******  336  *******
        013530  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        013532  000000                          HALT                    ;COND. CODES INCORRECT
   2148 013534  022700  000001          MDM6B:  CMP     #1,R0           ;CHECK DEST. REGISTER UNALTERED
```

```
2150 013540  001404                          BEQ     MDM6C
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                     ;           CONDITIONAL BRANCH INST. AND     <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                     ;           WHICH FOLLOWS W/ 757             <====
     013542  012742  000337                  MOV     #337,-(R2)      ;MOVE TO MAILBOX #  *******  337  *******
     013546  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     013550  000000                          HALT                    ;DEST. REGISTER INCORRECTLY ALTERED
2151 013552  022737  052525  000000  MDM6C:  CMP     #52525,@#0      ;CHECK DEST. DATA
2152 013560  001404                          BEQ     MDM6D
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                     ;           CONDITIONAL BRANCH INST. AND     <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                     ;           WHICH FOLLOWS W/ 747             <====
     013562  012742  000340                  MOV     #340,-(R2)      ;MOVE TO MAILBOX #  *******  340  *******
     013566  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     013570  000000                          HALT                    ;DEST. DATA INCORRECT
2153 013572  012700  000002          MDM6D:  MOV     #2,R0           ;R0=2
2154 013576  112760  000377  177777          MOVB    #377,-1(R0)     ;TRY MOVB DEST. MODE 6
2155 013604  022700  000002                  CMP     #2,R0           ;CHECK DEST. REGISTER UNALTERED
2156 013610  001404                          BEQ     MDM6E
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                     ;           CONDITIONAL BRANCH INST. AND     <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                     ;           WHICH FOLLOWS W/ 733             <====
     013612  012742  000341                  MOV     #341,-(R2)      ;MOVE TO MAILBOX #  *******  341  *******
     013616  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     013620  000000                          HALT                    ;DEST. REGISTER INCORRECTLY ALTERED
2157 013622  022737  177525  000000  MDM6E:  CMP     #177525,@#0     ;CHECK DEST. DATA
2158 013630  001404                          BEQ     TST154
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                     ;           CONDITIONAL BRANCH INST. AND     <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                     ;           WHICH FOLLOWS W/ 723             <====
     013632  012742  000342                  MOV     #342,-(R2)      ;MOVE TO MAILBOX #  *******  342  *******
     013636  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     013640  000000                          HALT                    ;DEST. DATA INCORRECT
                                                                     ;  OR SEQUENCE ERROR
2159
2160                                 ;**************************************************************************************
2161                                 ;
2162                                 ;        THIS TEST VERIFIES THE MOV DESTINATION MODE 7 AND MOVB - ODD BYTE
2163                                 ;DESTINATION MODE 7 INSTRUCTIONS. R4 POINTS TO TARGET LOC.0 AND R0
2164                                 ;IS USED AS THE MODE 7 ADDRESSING REGISTER. CMP INSTRUCTIONS ARE
2165                                 ;USED TO VERIFY PROPER ADDRFSSING AND DATA.
2166                                 ;
2167                                 ;**************************************************************************************
                                     ;TEST 154          TEST MOV DESTINATION MODE 7
                                     ;**************************************************************************************
     013642  005212                  TST154: INC     (R2)            ;UPDATE TEST NUMBER
     013644  022712  000154                  CMP     #154,(R2)       ;SEQUENCE ERROR?
     013650  001053                          BNE     TST155-10       ;BR TO ERROR HALT ON SEQ ERROR
2168 013652  005004                          CLR     R4              ;R4=0
2169 013654  005014                          CLR     (R4)            ;LOC.0=0
2170 013656  012700  000403                  MOV     #403,R0         ;R0=403
2171 013662  012770  070707  177777          MOV     #70707,@-1(R0)  ;TRY MOV W/DEST MODE 7
2172 013670  102402                          BVS     MDM7A           ;BR. TO ERROR IF V-BIT SET
```

```
   2173 013672  001401                              BEQ     MDM7A           ;BR TO ERROR IF Z-BIT SET
   2174 013674  100004                              BPL     MDM7B
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 765            <====
        013676                              MDM7A:
        013676  012742  000343                      MOV     #343,-(R2)      ;MOVE TO MAILBOX #  *******  343  *******
        013702  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        013704  000000                              HALT                    ;COND. CODES INCORRECT
   2175 013706  022700  000403              MDM7B:  CMP     #403,R0         ;CHECK DEST. REGISTER
   2176 013712  001404                              BEQ     MDM7C
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 756            <====
        013714  012742  000344                      MOV     #344,-(R2)      ;MOVE TO MAILBOX #  *******  344  *******
        013720  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        013722  000000                              HALT                    ;DEST. REGISTER INCORRECTLY ALTERED
   2177 013724  022737  070707  000000      MDM7C:  CMP     #70707,@#0      ;CHECK DEST. DATA
   2178 013732  001404                              BEQ     MDM7D
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 746            <====
        013734  012742  000345                      MOV     #345,-(R2)      ;MOVE TO MAILBOX #  *******  345  *******
        013740  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        013742  000000                              HALT                    ;DEST. DATA INCORRECT
   2179 013744  112770  107070  000001      MDM7D:  MOVB    #107070,@1(R0)  ;TRY MOVB W/DEST MODE 7--ODD BYTE
   2180 013752  022700  000403                      CMP     #403,R0         ;CHECK MODE 7 DEST. REG.
   2181 013756  001404                              BEQ     MDM7E
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 734            <====
        013760  012742  000346                      MOV     #346,-(R2)      ;MOVE TO MAILBOX #  *******  346  *******
        013764  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        013766  000000                              HALT                    ;DEST. DATA INCORRECT
   2182 013770  022737  034307  000000      MDM7E:  CMP     #34307,@#0      ;CHECK DEST. DATA
   2183 013776  001404                              BEQ     TST155
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 724            <====
        014000  012742  000347                      MOV     #347,-(R2)      ;MOVE TO MAILBOX #  *******  347  *******
        014004  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        014006  000000                              HALT                    ;DESTINATION DATA INCORRECT
                                                                            ;  OR SEQUENCE ERROR
   2184
   2185                                     ;*****************************************************************************
   2186                                     ;
   2187                                     ;       THIS TEST VERIFIES MODE 4 DOUBLE OPERAND INSTRUCTIONS.
   2188                                     ;THE TEST USES MODE 4 ADDRESSING WITH REGISTER 0 TO MOVE THRU A
   2189                                     ;TABLE OF OPERANDS.  THE TABLE OF OPERANDS AND THE WORK LOCATION IS
   2190                                     ;STORED FOLLOWING THE TEST CODE.  A SERIES OF 5 DOP INSTRUCTIONS UTILIZES
   2191                                     ;THE DATA IN THE TABLE TO CYCLE THE WORK LOCATION THRU A SET OF
   2192                                     ;VALUE.  THE DATA HAS BEEN CHOSEN TO INSURE THAT NO SINGLE ERROR WILL
```

```
                                    ;GO UNDETECTED.  WORD AND BYTE INSTRUCTION ACCESSING BOTH EVEN AND
                                    ;ODD ADDRESSES ARE USED IN THE TEST.  THE LISTING SHOWS THE
                                    ;EXPECTED INTERMEDIATE RESULT AS EACH INSTRUCTION IS EXECUTED.
                                    ;
                                    ;*****************************************************************************
                                    ;TEST 155        TEST MODE 4 W/ DOP INSTS.
                                    ;*****************************************************************************
     014010  005212                 TST155: INC      (R2)              ;UPDATE TEST NUMBER
     014012  022712  000155                 CMP      #155,(R2)         ;SEQUENCE ERROR?
     014016  001015                         BNE      DOP4              ;BR TO ERROR HALT ON SEQ ERROR
     014020  012700  014072                 MOV      #TBL1,R0          ;INITIALIZE R0
     014024  014037  014072                 MOV      -(R0),@#TBL1      ;TBL1=125252
     014030  064037  014072                 ADD      -(R0),@#TBL1      ;TBL1=000377
     014034  144037  014072                 BICB     -(R0),@#TBL1      ;TBL1=000252
     014040  154037  014073                 BISB     -(R0),@#TBL1+1    ;TBL1=125252
     014044  024037  014072                 CMP      -(R0),@#TBL1      ;CHECK RESULT
     014050  001411                         BEQ      TST156
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 762            <====
     014052                         DOP4:
     014052  012742  000350                 MOV      #350,-(R2)        ;MOVE TO MAILBOX #  *******  350  *******
     014056  005242                         INC      -(R2)             ;SET MSGTYP TO FATAL ERROR
     014060  000000                         HALT                       ;RESULT OF MODE 4 INSTS. INCORRECT
                                                                       ;  OR SEQUENCE ERROR

     014062  125252                         125252
     014064  052652                         52652
     014066  053125                         53125
     014070  125252                         125252
     014072  000000                 TBL1:   0

                                    ;*****************************************************************************
                                    ;
                                    ;            THIS TEST VERIFIES MODE 5 DOUBLE OPERAND INSTRUCTIONS.
                                    ;THE TEST USES AN ADDRESS TABLE STORED FOLLOWING THE TEST CODE.
                                    ;THIS TABLE IS SIMPLY A TABLE OF ADDRESS POINTERS WHICH ADDRESS
                                    ;THE DATA TABLE USED IN THE PREVIOUS TEST.  THE TEST IS IDENTICAL TO
                                    ;THE PREVIOUS TEST EXCEPT THE DATA IS REFERENCED USING THIS ADDRESS
                                    ;TABLE AND MODE 5 ADDRESSING.  (SEE PREVIOUS TEST).
                                    ;
                                    ;*****************************************************************************
                                    ;TEST 156        TEST MODE 5 W/ DOP INSTS.
                                    ;*****************************************************************************
     014074  005212                 TST156: INC      (R2)              ;UPDATE TEST NUMBER
     014076  022712  000156                 CMP      #156,(R2)         ;SEQUENCE ERROR?
     014102  001015                         BNE      DOP5              ;BR TO ERROR HALT ON SEQ ERROR
     014104  012700  014160                 MOV      #TBL2+2,R0        ;INITIALIZE R0
     014110  015037  014072                 MOV      @-(R0),@#TBL1     ;TBL1=125252
     014114  065037  014072                 ADD      @-(R0),@#TBL1     ;TBL1=000377
     014120  145037  014072                 BICB     @-(R0),@#TBL1     ;TBL1=000252
     014124  155037  014073                 BISB     @-(R0),@#TBL1+1   ;TBL1=125252
     014130  025037  014072                 CMP      @-(R0),@#TBL1     ;CHECK RESULT
     014134  001411                         BEQ      TST157
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                  ;                  REPLACE THE MOVE INSTRUCTION   <====
                                                                  ;                  WHICH FOLLOWS W/ 762           <====
     014136                                  DOP5:
     014136  012742  000351                           MOV     #351,-(R2)      ;MOVE TO MAILBOX #, *******  351  *******
     014142  005242                                   INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     014144  000000                                   HALT                    ;RESULT OF MODE 5 INSTS. INCORRECT
                                                                              ;  OR SEQUENCE ERROR
     014146  014062                                   TBL1-10
     014150  014064                                   TBL1-6
     014152  014065                                   TBL1-5
     014154  014066                                   TBL1-4
     014156  014070                          TBL2:    TBL1-2
                                             ;*******************************************************************************
                                             ;
                                             ;               THIS TEST VERIFIES MODE 6 DOUBLE OPERAND INSTRUCTIONS.
                                             ;IT USES THE SAME DATA AS THAT USED IN THE MODE 4 TESTS.
                                             ;THIS TIME THE DATA IS ACCESSED USING MODE 6.  R0 IS SET
                                             ;TO POINT TO THE MIDDLE OF THE TABLE.  THE TABLE IS ACCESSED FROM
                                             ;BOTTOM TO TOP BY VARYING THE OFFSET IN THE MODE 6 INSTRUCTIONS.
                                             ;THE DATA RESULTS ARE IDENTICAL TO THOSE EXPECTED IN THE MODE 4
                                             ;TESTS.
                                             ;
                                             ;*******************************************************************************
                                             ;TEST 157         TEST MODE 6 W/ DOP INSTS.
                                             ;*******************************************************************************
     014160  005212                          TST157:  INC     (R2)            ;UPDATE TEST NUMBER
     014162  022712  000157                           CMP     #157,(R2)       ;SEQUENCE ERROR?
     014166  001022                                   BNE     TST160-10       ;BR TO ERROR HALT ON SEQ ERROR
     014170  012700  014066                           MOV     #TBL1-4,R0      ;INITIALIZE R0
     014174  016037  000002  014072                   MOV     2(R0),@#TBL1    ;TBL1=125252
     014202  066037  000000  014072                   ADD     0(R0),@#TBL1    ;TBL1=000377
     014210  146037  177777  014072                   BICB    -1(R0),@#TBL1   ;TBL1=000252
     014216  156037  177776  014073                   BISB    -2(R0),@#TBL1+1 ;TBL1=125252
     014224  026037  177774  014072                   CMP     -4(R0),@#TBL1   ;CHECK RESULT
     014232  001404                                   BEQ     TST160
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                  ;           CONDITIONAL BRANCH INST. AND  <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION  <====
                                                                  ;           WHICH FOLLOWS W/ 755          <====
     014234  012742  000352                           MOV     #352,-(R2)      ;MOVE TO MAILBOX #  *******  352  *******
     014240  005242                                   INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     014242  000000                                   HALT                    ;RESULT OF MODE 6 INSTS. INCORRECT
                                                                              ;  OR SEQUENCE ERROR
                                             ;*******************************************************************************
                                             ;
                                             ;               THIS TEST VERIFIES MODE 7 DOUBLE OPERAND INSTRUCTIONS.
                                             ;THIS TEST USES THE SAME ADDRESS TABLE AND DATA TABLE USED BY
                                             ;THE MODE 5 TESTS.  THIS TIME THE DATA IS ACCESSED USING MODE 7.
                                             ;R0 IS SET TO POINT TO THE MIDDLE OF THE ADDRESS TABLE IN THE MODE 5
                                             ;TEST.  THE TABLE IS ACCESSED FROM BOTTOM TO TOP BY VARYING THE OFFSET
                                             ;IN THE MODE 7 INSTRUCTIONS.  THE DATA RESULTS ARE IDENTICAL TO
                                             ;THOSE EXPECTED IN THE MODE 5 TESTS.
                                             ;
                                             ;*******************************************************************************
                                             ;TEST 160         TEST MODE 7 W/ DOP INSTS.
                                             ;*******************************************************************************
     014244  005212                          TST160:  INC     (R2)            ;UPDATE TEST NUMBER
```

```
014246  022712  000160                         CMP     #160,(R2)           ;SEQUENCE ERROR?
014252  001022                                 BNE     TST161-10           ;BR TO ERROR HALT ON SEQ ERROR
014254  012700  014152                         MOV     #TBL2-4,R0          ;INITIALIZE R0
014260  017037  000004  014072                 MOV     @4(R0),@#TBL1       ;TBL1=125252
014266  067037  000002  014072                 ADD     @2(R0),@#TBL1       ;TBL1=000377
014274  147037  000000  014072                 BICB    @0(R0),@#TBL1       ;TBL1=000252
014302  157037  177776  014073                 BISB    @-2(R0),@#TBL1+1                ;TBL1=125252
014310  027037  177774  014072                 CMP     @-4(R0),@#TBL1           ;CHECK RESULT
014316  001404                                 BEQ     TST161
                                                                           ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                           ;           CONDITIONAL BRANCH INST. AND    <====
                                                                           ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                           ;           WHICH FOLLOWS W/ 755            <====
014320  012742  000353                         MOV     #353,-(R2)          ;MOVE TO MAILBOX #  *******  353  *******
014324  005242                                 INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
014326  000000                                 HALT                        ;RESULT OF MODE 7 INSTS INCORRECT
                                                                           ;  OR SEQUENCE ERROR
                                       ;*******************************************************************************
                                       ;
                                       ;       THIS TEST VERIFIES THE ROTATE MODE 0 INSTRUCTIONS.
                                       ;R0 IS LOADED WITH A DATA PATTERN, THE C-BIT IS LOADED, AND
                                       ;AN ROL INSTRUCTION IS EXECUTED WITH MODE 0.  THE OPERATION IS CHECKED
                                       ;BY TESTING THE RESULTING DATA AND THE STATE OF THE C AND V BITS.
                                       ;NEXT, THE SAME PROCEDURE IS EXECUTED TO TEST MODE 0 BYTE INSTRUCTIONS.
                                       ;
                                       ;*******************************************************************************
                                       ;TEST 161        TEST ROTATE INSTRUCTIONS OF MODE 0
                                       ;*******************************************************************************
014330  005212                         TST161: INC     (R2)                ;UPDATE TEST NUMBER
014332  022712  000161                         CMP     #161,(R2)           ;SEQUENCE ERROR?
014336  001026                                 BNE     TST162-10           ;BR TO ERROR HALT ON SEQ ERROR
014340  012700  125252                         MOV     #125252,R0          ;INITIALIZE DATA
014344  000261                                 SEC                         ;SET C-BIT
014346  006100                                 ROL     R0                  ;TRY ROL W/ MODE 0
014350  102004                                 BVC     ROT0A               ;CC=0011
014352  103003                                 BCC     ROT0A
014354  022700  052525                         CMP     #052525,R0          ;CHECK DATA
014360  001404                                 BEQ     ROT0B
                                                                           ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                           ;           CONDITIONAL BRANCH INST. AND    <====
                                                                           ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                           ;           WHICH FOLLOWS W/ 766            <====
014362                                 ROT0A:
014362  012742  000354                         MOV     #354,-(R2)          ;MOVE TO MAILBOX #  *******  354  *******
014366  005242                                 INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
014370  000000                                 HALT                        ;ROL MODE 0 FAILED
014372  012700  125252                 ROT0B:  MOV     #125252,R0          ;INITIALIZE DATA
014376  000261                                 SEC                         ;SET C-BIT
014400  106100                                 ROLB    R0                  ;TRY ROL W/ MODE 0 EVEN BYTE
014402  102004                                 BVC     ROT0C               ;CC=0011
014404  103003                                 BCC     ROT0C
014406  022700  125125                         CMP     #125125,R0          ;CHECK DATA
014412  001404                                 BEQ     TST162
                                                                           ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                           ;           CONDITIONAL BRANCH INST. AND    <====
                                                                           ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                           ;           WHICH FOLLOWS W/ 751            <====
     014414                              ROTOC:
     014414  012742  000355                         MOV     #355,-(R2)          ;MOVE TO MAILBOX #  *******  355  *******
     014420  005242                                 INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     014422  000000                                 HALT                        ;ROLB MODE 0 FAILED
                                                                                ;  OR SEQUENCE ERROR

                                         ;*******************************************************************************
                                         ;
                                         ;          THIS TEST VERIFIES THE ROTATE MODE 1 INSTRUCTIONS.
                                         ;THE DATA TO BE ROTATED IS IN LOC 0.  R0 IS USED AS THE
                                         ;ADDRESSING REGISTER.  THE C-BIT IS LOADED AND AN ROL IS EXECUTED.
                                         ;THE RESULTS ARE CHECKED BY COMPARING THE DATA RESULTS AND TESTING
                                         ;THE C AND V BITS.  THIS PROCEDURE IS THEN REPEATED TWICE MORE
                                         ;TO TEST THE BYTE ROTATES.  FIRST ON BYTE 0, THEN ON BYTE 1.
                                         ;
                                         ;*******************************************************************************
                                         ;TEST 162          TEST ROTATE INSTRUCTIONS W/ MODE 1
                                         ;*******************************************************************************
     014424  005212                      TST162: INC        (R2)                ;UPDATE TEST NUMBER
     014426  022712  000162                         CMP     #162,(R2)           ;SEQUENCE ERROR?
     014432  001051                                 BNE     TST163-10           ;BR TO ERROR HALT ON SEQ ERROR
     014434  005000                                 CLR     R0                  ;POINT TO LOC. 0
     014436  012710  052525                         MOV     #52525,(R0)         ;INITIALIZE DATA
     014442  000241                                 CLC                         ;CLEAR C-BIT
     014444  006110                                 ROL     (R0)                ;TRY ROL W/ MODE 1
     014446  102005                                 BVC     ROT1A               ;CC=1010
     014450  103404                                 BCS     ROT1A
     014452  023727  000000  125252                 CMP     @#0,#125252         ;CHECK RESULT
     014460  001404                                 BEQ     ROT1B
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                                ;           WHICH FOLLOWS W/ 764            <====
     014462                              ROT1A:
     014462  012742  000356                         MOV     #356,-(R2)          ;MOVE TO MAILBOX #  *******  356  *******
     014466  005242                                 INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     014470  000000                                 HALT                        ;ROL MODE 1 FAILED
     014472  000261                      ROT1B:     SEC
     014474  012710  125252                         MOV     #125252,(R0)        ;INITIALIZE DATA
     014500  106110                                 ROLB    (R0)                ;TRY ROLB W/ MODE 1 EVEN BYTE
     014502  102005                                 BVC     ROT1C               ;CC=1011
     014504  103004                                 BCC     ROT1C
     014506  022737  125125  000000                 CMP     #125125,@#0         ;TEST RESULT
     014514  001404                                 BEQ     ROT1D
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                                ;           WHICH FOLLOWS W/ 746            <====
     014516                              ROT1C:
     014516  012742  000357                         MOV     #357,-(R2)          ;MOVE TO MAILBOX #  *******  357  *******
     014522  005242                                 INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     014524  000000                                 HALT                        ;ROLB W/ MODE 1 EVEN BYTE FAILED
     014526  012710  125252              ROT1D:     MOV     #125252,(R0)
     014532  005000                                 CLR     R0                  ;POINT TO ODD BYTE
     014534  005200                                 INC     R0
     014536  000261                                 SEC                         ;SET C-BIT
     014540  106110                                 ROLB    (R0)                ;TRY ROLB W/ MODE 1 ODD BYTE
     014542  102005                           BVC     ROT1E             ;CC=0011
     014544  103004                           BCC     ROT1E
     014546  022737  052652  000000           CMP     #052652,@#0       ;CHECK DATA
     014554  001404                           BEQ     TST163
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 726            <====
     014556                           ROT1E:
     014556  012742  000360                   MOV     #360,-(R2)        ;MOVE TO MAILBOX #  *******  360  *******
     014562  005242                           INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
     014564  000000                           HALT                      ;ROLB W/ MODE 1 ODD BYTE FAILED
                                                                        ;  OR SEQUENCE ERROR

                                      ;*****************************************************************************
                                      ;
                                      ;          THIS TEST VERIFIES MODE 2 ROTATE INSTRUCTIONS.
                                      ;THE SAME PROCEDURE AS IN THE OTHER ROTATE TESTS ARE USED.  R0
                                      ;IS USED AS THE ADDRESSING REGISTER AND IS CHECKED FOR PROPER
                                      ;INCREMENTING.  BYTE INSTRUCTIONS ARE ALSO CHECKED.
                                      ;
                                      ;*****************************************************************************
                                      ;TEST 163        TEST ROTATE INSTRUCTIONS W/ MODE 2
                                      ;*****************************************************************************
     014566  005212                   TST163: INC     (R2)              ;UPDATE TEST NUMBER
     014570  022712  000163                   CMP     #163,(R2)         ;SEQUENCE ERROR?
     014574  001057                           BNE     TST164-10         ;BR TO ERROR HALT ON SEQ ERROR
     014576  005000                           CLR     R0                ;POINT TO LOC 0
     014600  012710  173737                   MOV     #173737,(R0)      ;INITIALIZE DATA
     014604  000241                           CLC                       ;CLEAR C-BIT
     014606  006120                           ROL     (R0)+             ;TRY ROL W/ MODE 2
     014610  103007                           BCC     ROT2A             ;CHECK C-BIT
     014612  022737  167676  000000           CMP     #167676,@#0       ;CHECK DATA
     014620  001003                           BNE     ROT2A             ;BRANCH IF RESULT INCORRECT
     014622  005300                           DEC     R0                ;TEST R0
     014624  005300                           DEC     R0
     014626  001404                           BEQ     ROT2B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 762            <====
     014630                           ROT2A:
     014630  012742  000361                   MOV     #361,-(R2)        ;MOVE TO MAILBOX #  *******  361  *******
     014634  005242                           INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
     014636  000000                           HALT                      ;ROL W/ MODE 2 FAILED
     014640  005000                   ROT2B:  CLR     R0                ;POINT TO LOC 0
     014642  012710  004040                   MOV     #4040,(R0)        ;INITIALIZE DATA
     014646  000241                           CLC                       ;CLEAR C-BIT
     014650  106120                           ROLB    (R0)+             ;TRY ROLB W/ MODE 2 EVEN BYTE
     014652  103406                           BCS     ROT2C             ;CHECK C-BIT
     014654  022737  004100  000000           CMP     #4100,@#0         ;CHECK DATA
     014662  001002                           BNE     ROT2C             ;BRANCH IF DATA INCORRECT
     014664  005300                           DEC     R0                ;CHECK R0
     014666  001404                           BEQ     ROT2D
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                     ;           WHICH FOLLOWS W/ 742         <====
     014670                             ROT2C:
     014670  012742  000362                     MOV     #362,-(R2)      ;MOVE TO MAILBOX #  *******  362  *******
     014674  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     014676  000000                             HALT                    ;ROLB W/ MODE 2 EVEN BYTE FAILED
2356 014700  005000                     ROT2D:  CLR     R0              ;POINT TO LOC 0
2357 014702  012710  004040                     MOV     #4040,(R0)      ;INITIALIZE DATA
2358 014706  005200                             INC     R0              ;POINT TO ODD BYTE OF DATA
2359 014710  000261                             SEC                     ;SET C-BIT
2360 014712  106120                             ROLB    (R0)+           ;TRY ROL W/ MODE 2 ODD BYTE
2361 014714  103407                             BCS     ROT2E           ;CHECK C-BIT
2362 014716  022737  010440  000000             CMP     #10440,@#0      ;CHECK DATA
2363 014724  001003                             BNE     ROT2E           ;BRANCH IF DATA INCORRECT
2364 014726  005300                             DEC     R0              ;CHECK R0
2365 014730  005300                             DEC     R0
2366 014732  001404                             BEQ     TST164
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                     ;           CONDITIONAL BRANCH INST. AND     <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                     ;           WHICH FOLLOWS W/ 720             <====
     014734                             ROT2E:
     014734  012742  000363                     MOV     #363,-(R2)      ;MOVE TO MAILBOX #  *******  363  *******
     014740  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     014742  000000                             HALT                    ;ROLB W/ MODE 2 ODD BYTE FAILED
                                                                     ;  OR SEQUENCE ERROR
2367
2368                                    ;*******************************************************************************
2369                                    ;
2370                                    ;       THIS TEST VERIFIES MODE 3 ROTATE INSTRUCTIONS.
2371                                    ;THIS TEST USES THE SAME PROCEDURES AS IN THE OTHER ROTATE
2372                                    ;TESTS.  THE DATA IS STORED IN LOC. 0 AND IS ADDRESSED USING
2373                                    ;MODE 37.  BYTE ADDRESSING IS ALSO CHECKED FOR EVEN AND ODD BYTES.
2374                                    ;
2375                                    ;*******************************************************************************
                                        ;TEST 164       TEST ROTATE INSTRUCTIONS /W MODE 3
                                        ;*******************************************************************************
     014744  005212                     TST164: INC     (R2)            ;UPDATE TEST NUMBER
     014746  022712  000164                     CMP     #164,(R2)       ;SEQUENCE ERROR?
     014752  001051                             BNE     TST165-10       ;BR TO ERROR HALT ON SEQ ERROR
2376 014754  012737  052525  000000             MOV     #52525,@#0      ;INITIALIZE DATA IN LOC 0
2377 014762  000261                             SEC                     ;SET C-BIT
2378 014764  006137  000000                     ROL     @#0             ;TRO ROL W/ MODE 3
2379 014770  103404                             BCS     ROT3A           ;CHECK C-BIT
2380 014772  022737  125253  000000             CMP     #125253,@#0     ;CHECK DATA
2381 015000  001404                             BEQ     ROT3B
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                     ;           CONDITIONAL BRANCH INST. AND     <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                     ;           WHICH FOLLOWS W/ 764             <====
     015002                             ROT3A:
     015002  012742  000364                     MOV     #364,-(R2)      ;MOVE TO MAILBOX #  *******  364  *******
     015006  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     015010  000000                             HALT                    ;ROL W/ MODE 3 FAILED
2382 015012  012737  125252  000000     ROT3B:  MOV     #125252,@#0     ;INITIALIZE DATA
2383 015020  000241                             CLC                     ;CLEAR C-BIT
2384 015022  106137  000000                     ROLB    @#0             ;TRY ROL W/ MODE 3 EVEN BYTE
2385 015026  103004                             BCC     ROT3C           ;CHECK C-BIT
```

```
015030  023727  000000  125124  4$:     CMP     @#0,#125124             ;CHECK DATA
015036  001404                          BEQ     ROT3D
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 745            <====
015040                          ROT3C:
015040  012742  000365                  MOV     #365,-(R2)              ;MOVE TO MAILBOX #  *******  365  *******
015044  005242                          INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
015046  000000                          HALT                            ;ROL W/ MODE 3 EVEN BYTE FAILED
015050  012737  125252  000000  ROT3D:  MOV     #125252,@#0             ;INITIALIZE DATA IN LOC. 0
015056  000261                          SEC                             ;SET C-BIT
015060  106137  000001                  ROLB    @#1                     ;TRY ROL W/ MODE 3 ODD BYTE
015064  103004                          BCC     ROT3E                   ;CHECK C-BIT
015066  022737  052652  000000          CMP     #052652,@#0             ;CHECK DATA
015074  001404                          BEQ     TST165
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 726            <====
015076                          ROT3E:
015076  012742  000366                  MOV     #366,-(R2)              ;MOVE TO MAILBOX #  *******  366  *******
015102  005242                          INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
015104  000000                          HALT                            ;ROL W/ MODE 3 ODD BYTE FAILED
                                                                        ;  OR SEQUENCE ERROR

                                ;*******************************************************************************
                                ;
                                ;
                                ;       THIS TEST VERIFIES MODE 4 ROTATE INSTRUCTIONS.  THE DATA IS
                                ;STORED IN LOC. 0.  R0 IS SET TO 2 AND THE CARRY IS SET.  AN ROL MODE 4
                                ;IS USED TO ROTATE LOCATION 0 USING R0.  THE DATA IS CHECKED
                                ;AND THE C AND V BITS ARE TESTED.  THE PROPER DECREMENTING OF
                                ;R0 IS VERIFIED.
                                ;
                                ;*******************************************************************************
                                ;TEST 165       TEST MODE 4 W/ ROTATE INSTRUCTIONS
                                ;*******************************************************************************
015106  005212                  TST165: INC     (R2)                    ;UPDATE TEST NUMBER
015110  022712  000165                  CMP     #165,(R2)               ;SEQUENCE ERROR?
015114  001016                          BNE     TST166-10               ;BR TO ERROR HALT ON SEQ ERROR
015116  012737  070707  000000          MOV     #070707,@#0             ;INITIALIZE DATA IN LOC. 0
015124  012700  000002                  MOV     #2,R0                   ;INITIALIZE R0 AS POINTER
015130  000261                          SEC                             ;SET C-BIT
015132  006140                          ROL     -(R0)                   ;TRY ROL W/ MODE 4
015134  103406                          BCS     ROT4                    ;CHECK C-BIT
015136  022737  161617  000000          CMP     #161617,@#0             ;CHECK DATA
015144  001002                          BNE     ROT4                    ;BRANCH IF DATA INCORRECT
015146  005700                          TST     R0                      ;CHECK MODE 4 REGISTER
015150  001404                          BEQ     TST166
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 761            <====
015152                          ROT4:
015152  012742  000367                  MOV     #367,-(R2)              ;MOVE TO MAILBOX #  *******  367  *******
015156  005242                          INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
015160  000000                          HALT                            ;ROL MODE 4 FAILED
```

```
                                                                          ;  OR SEQUENCE ERROR

                                          ;*******************************************************************************
                                          ;
                                          ;       THIS TEST VERIFIES MODE 5 ROTATE INSTRUCTIONS.
                                          ;THE DATA IS STORED IN A WORK LOCATION (ROTX) AT THE END OF THE
                                          ;TEST CODE.  LOC. 0 IS LOADED WITH THE ADDRESS OF THE DATA (ROTX).
                                          ;RO IS SET TO 2.  THE CARRY IS CLEARED AND A MODE 5 ROL
                                          ;IS EXECUTED USING RO AS AN ADDRESSING REGISTER.  THE DATA IS
                                          ;CHECKED, THE C AND V BITS TESTED, AND RO CHECKED FOR PROPER
                                          ;DECREMENTING.
                                          ;
                                          ;*******************************************************************************
                                          ;TEST 166        TEST MODE 5 W/ ROTATE INSTRUCTIONS
                                          ;*******************************************************************************
 015162  005212                           TST166: INC     (R2)             ;UPDATE TEST NUMBER
 015164  022712  000166                           CMP     #166,(R2)        ;SEQUENCE ERROR?
 015170  001021                                   BNE     ROT5             ;BR TO ERROR HALT ON SEQ ERROR
 015172  012737  015244  000000                   MOV     #ROTX,@#0        ;MOVE POINTER TO LOC. 0
 015200  012700  000002                           MOV     #2,R0            ;SET MODE 5 REG. TO LOC. 0
 015204  012767  107070  000032                   MOV     #107070,ROTX     ;INITIALIZE DATA
 015212  000241                                   CLC                      ;CLEAR C-BIT
 015214  006150                                   ROL     @-(R0)           ;TRY ROL W/ MODE 5
 015216  103006                                   BCC     ROT5             ;CHECK C-BIT
 015220  022737  016160  015244                   CMP     #016160,@#ROTX   ;CHECK DATA
 015226  001002                                   BNE     ROT5             ;BRANCH IF DATA INCORRECT
 015230  005700                                   TST     R0               ;CHECK MODE 5 REGISTER
 015232  001405                                   BEQ     TST167
                                                                           ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                           ;           CONDITIONAL BRANCH INST. AND    <====
                                                                           ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                           ;           WHICH FOLLOWS W/ 756            <====
 015234                                   ROT5:
 015234  012742  000370                           MOV     #370,-(R2)       ;MOVE TO MAILBOX #  *******  370  *******
 015240  005242                                   INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
 015242  000000                                   HALT                     ;ROL MODE 5 FAILED
                                                                           ;  OR SEQUENCE ERROR
 015244  000000                           ROTX:   0

                                          ;*******************************************************************************
                                          ;
                                          ;       THIS TEST VERIFIES MODE 6 ROTATE INSTRUCTIONS.
                                          ;IT USES THE SAME PROCEDURE AS THE ABOVE TEST EXCEPT THE
                                          ;ROTATE INSTRUCTION USES MODE 6 ADDRESSING WITH REGISTER 7.
                                          ;THE DATA IS STILL OPERATED ON IN LOC. ROTX (SEE PREVIOUS TEST).
                                          ;
                                          ;*******************************************************************************
                                          ;TEST 167        TEST MODE 6 W/ ROTATE INSTRUCTIONS
                                          ;*******************************************************************************
 015246  005212                           TST167: INC     (R2)             ;UPDATE TEST NUMBER
 015250  022712  000167                           CMP     #167,(R2)        ;SEQUENCE ERROR?
 015254  001013                                   BNE     TST170-10        ;BR TO ERROR HALT ON SEQ ERROR
 015256  012737  125252  015244                   MOV     #125252,@#ROTX   ;INITIALIZE DATA
 015264  000261                                   SEC                      ;SET C-BIT
 015266  006167  177752                           ROL     ROTX             ;TRY ROL W/ MODE 6
 015272  103004                                   BCC     ROT6             ;CHECK C-BIT
 015274  022737  052525  015244                   CMP     #52525,@#ROTX    ;CHECK DATA
```

```
     015302  001404                          BEQ     TST170
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                  ;           CONDITIONAL BRANCH INST. AND    <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                  ;           WHICH FOLLOWS W/ 764            <====
     015304                          ROT6:
     015304  012742  000371                  MOV     #371,-(R2)       ;MOVE TO MAILBOX #  *******  371  *******
     015310  005242                          INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     015312  000000                          HALT                     ;ROL W/ MODE 6 FAILED
                                                                  ;  OR SEQUENCE ERROR


                                     ;*************************************************************************
                                     ;
                                     ;THIS TEST VERIFIES MODE 7 ROTATE INSTRUCTIONS.
                                     ;THE DATA IS SET IN LOC. ROTX, (SEE PREVIOUS TEST).  THE ROL INSTRUCTION
                                     ;ADDRESSES IT INDIRECTLY USING MODE 7 AND INDIRECT ADDRESS LOCATION
                                     ;(ROTXAD) FOLLOWING THE TEST CODE.
                                     ;
                                     ;*************************************************************************
                                     ;TEST 170         TEST MODE 7 W/ ROTATE INSTRUCTIONS
                                     ;*************************************************************************
     015314  005212                  TST170: INC     (R2)             ;UPDATE TEST NUMBER
     015316  022712  000170                  CMP     #170,(R2)        ;SEQUENCE ERROR?
     015322  001016                          BNE     ROT7             ;BR TO ERROR HALT ON SEQ ERROR
     015324  012737  052525  015244          MOV     #52525,@#ROTX    ;INITIALIZE DATA
     015332  012737  015244  015370          MOV     #ROTX,@#ROTXAD   ;INITIALIZE ADDRESS POINTER
     015340  000241                          CLC                      ;CLEAR C-BIT
     015342  006177  000022                  ROL     @ROTXAD          ;TRY ROL W/ MODE 7
     015346  103404                          BCS     ROT7             ;CHECK C-BIT
     015350  023727  015244  125252          CMP     @#ROTX,#125252   ;CHECK DATA
     015356  001405                          BEQ     TST171
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                  ;           CONDITIONAL BRANCH INST. AND    <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                  ;           WHICH FOLLOWS W/ 761            <====
     015360                          ROT7:
     015360  012742  000372                  MOV     #372,-(R2)       ;MOVE TO MAILBOX #  *******  372  *******
     015364  005242                          INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     015366  000000                          HALT                     ;ROL W/ MODE 7 FAILED
                                                                  ;  OR SEQUENCE ERROR
     015370  000000                  ROTXAD: 0


                                     ;*************************************************************************
                                     ;
                                     ;        THIS TEST VERIFIES MODE 0 SWAB INSTRUCTION.  R0 IS SET TO
                                     ;177400.  A SWAB MODE 0 IS EXECUTED AND THE CONDITIONAL BRANCH
                                     ;IS USED TO CHECK THE SIGN OF THE RESULT.  ALSO, A COMPARISON
                                     ;IS MADE TO CHECK THE DATA RESULTS.
                                     ;
                                     ;*************************************************************************
                                     ;TEST 171         TEST MODE 0 W/ SWAB INST.
                                     ;*************************************************************************
     015372  005212                  TST171: INC     (R2)             ;UPDATE TEST NUMBER
     015374  022712  000171                  CMP     #171,(R2)        ;SEQUENCE ERROR?
     015400  001013                          BNE     TST172-10        ;BR TO ERROR HALT ON SEQ ERROR
     015402  012700  177400                  MOV     #177400,R0       ;MOVE TEST PATTERN TO R0
```

```
015406  000300                          SWAB    R0              ;TRY SWAB MODE 0
015410  100404                          BMI     SB0
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 773            <====
015412  012742  000373                  MOV     #373,-(R2)      ;MOVE TO MAILBOX #  *******  373  *******
015416  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
015420  000000                          HALT                    ;SWAB DID NOT SET CC'S CORRECT
015422  022700  000377          SB0:    CMP     #377,R0         ;CHECK RESULT
015426  001404                          BEQ     TST172
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 764            <====
015430  012742  000374                  MOV     #374,-(R2)      ;MOVE TO MAILBOX #  *******  374  *******
015434  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
015436  000000                          HALT                    ;RESULT OF SWAB MODE 0 FAILED
                                                                ;  OR SEQUENCE ERROR

                                ;************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 1 SWAB INSTRUCTION.  THE TEST
                                ;PATTERN IS MOVED TO LOC 0.  R0 IS CLEARED AND USED AS THE ADDRESSING
                                ;REGISTER IN THE MODE 1 SWAB.  THE DATA RESULTS ARE CHECKED WITH
                                ;A COMPARE.
                                ;
                                ;************************************************************************
                                ;TEST 172       TEST MODE 1 W/ SWAB INST
                                ;************************************************************************
015440  005212                  TST172: INC     (R2)            ;UPDATE TEST NUMBER
015442  022712  000172                  CMP     #172,(R2)       ;SEQUENCE ERROR?
015446  001011                          BNE     TST173-10       ;BR TO ERROR HALT ON SEQ ERROR
015450  012737  125652  000000          MOV     #125652,@#0     ;MOVE TEST PATTERN TO LOC. 0
015456  005000                          CLR     R0              ;R0=0
015460  000310                          SWAB    (R0)            ;TRY SWAB MODE 1
015462  022737  125253  000000          CMP     #125253,@#0     ;CHECK RESULT
015470  001404                          BEQ     TST173
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 766            <====
015472  012742  000375                  MOV     #375,-(R2)      ;MOVE TO MAILBOX #  *******  375  *******
015476  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
015500  000000                          HALT                    ;RESULT OF SWAB MODE 1 FAILED
                                                                ;  OR SEQUENCE ERROR

                                ;************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 2 SWAB INSTRUCTION.  THE TEST
                                ;PATTERN IS MOVED TO LOC 0.  R0 IS CLEARED AND USED AS THE MODE
                                ;2 ADDRESSING REGISTER.  THE RESULTS ARE CHECKED WITH A COMPARE.
                                ;R0 IS CHECKED FOR PROPER DECREMENTING.
                                ;
                                ;************************************************************************
                                ;TEST 173       TEST MODE 2 W/ SWAB INST
```

```
                                              ;*************************************************************************
     015502  005212                           TST173: INC     (R2)             ;UPDATE TEST NUMBER
     015504  022712  000173                           CMP     #173,(R2)        ;SEQUENCE ERROR?
     015510  001020                                   BNE     TST174-10        ;BR TO ERROR HALT ON SEQ ERROR
     015512  012737  125152  000000                   MOV     #125152,@#0      ;MOVE TEST PATTERN TO LOC. 0
     015520  005000                                   CLR     R0               ;R0=0
     015522  000320                                   SWAB    (R0)+            ;TRY SWAB MODE 2
     015524  022737  065252  000000                   CMP     #65252,@#0       ;CHECK RESULT
     015532  001404                                   BEQ     SB2
                                                                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                               ;          CONDITIONAL BRANCH INST. AND     <====
                                                                               ;          REPLACE THE MOVE INSTRUCTION     <====
                                                                               ;          WHICH FOLLOWS W/ 766             <====
     015534  012742  000376                           MOV     #376,-(R2)       ;MOVE TO MAILBOX #  *******  376  *******
     015540  005242                                   INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     015542  000000                                   HALT                     ;RESULT OF SWAB MODE 0 FAILED
     015544  162700  000002                   SB2:    SUB     #2,R0            ;CHECK EFFECT OF REG.
     015550  001404                                   BEQ     TST174
                                                                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                               ;          CONDITIONAL BRANCH INST. AND     <====
                                                                               ;          REPLACE THE MOVE INSTRUCTION     <====
                                                                               ;          WHICH FOLLOWS W/ 757             <====
     015552  012742  000377                           MOV     #377,-(R2)       ;MOVE TO MAILBOX #  *******  377  *******
     015556  005242                                   INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     015560  000000                                   HALT                     ;REGISTER VALUE INCORRECT
                                                                               ;  OR SEQUENCE ERROR



                                              ;*************************************************************************
                                              ;
                                              ;       THIS TEST VERIFIES MODE 3 SWAB INSTRUCTION.  THE TEST
                                              ;PATTERN IS MOVED TO LOC 0.  A MODE 3 SWAB INSTRUCTION IS EXECUTED
                                              ;USING R7 AS THE ADDRESSING REGISTER.  A COMPARE VERIFIES THE
                                              ;DATA RESULTS.
                                              ;
                                              ;*************************************************************************
                                              ;TEST 174        TEST MODE 3 W/SWAB INST.
                                              ;*************************************************************************
     015562  005212                           TST174: INC     (R2)             ;UPDATE TEST NUMBER
     015564  022712  000174                           CMP     #174,(R2)        ;SEQUENCE ERROR?
     015570  001011                                   BNE     TST175-10        ;BR TO ERROR HALT ON SEQ ERROR
     015572  012737  000377  000000                   MOV     #377,@#0         ;MOVE TEST PATTERN TO LOC. 0
     015600  000337  000000                           SWAB    @#0              ;TRY SWAB W/ MODE 3
     015604  022737  177400  000000                   CMP     #177400,@#0      ;CHECK RESULT
     015612  001404                                   BEQ     TST175
                                                                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                               ;          CONDITIONAL BRANCH INST. AND     <====
                                                                               ;          REPLACE THE MOVE INSTRUCTION     <====
                                                                               ;          WHICH FOLLOWS W/ 766             <====
     015614  012742  000400                           MOV     #400,-(R2)       ;MOVE TO MAILBOX #  *******  400  *******
     015620  005242                                   INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     015622  000000                                   HALT                     ;RESULT OF SWAB INCORRECT
                                                                               ;  OR SEQUENCE ERROR



                                              ;*************************************************************************
                                              ;
```

```
                                        ;       THIS TEST VERIFIES MODE 4 SWAB INSTRUCTIONS.  THE DATA
                                        ;IS MOVED TO LOC 0.  R0 IS SET TO 2 AND USED AS THE MODE 4 ADDRESSING
                                        ;REGISTER.  THE DATA IS CHECKED WITH A COMPARE AND R0 IS CHECKED
                                        ;FOR PROPER DECREMENTING.
                                        ;
                                        ;*****************************************************************************
                                        ;TEST 175        TEST MODE 4 W/ SWAB INST
                                        ;*****************************************************************************
015624  005212                          TST175: INC     (R2)            ;UPDATE TEST NUMBER
015626  022712  000175                          CMP     #175,(R2)       ;SEQUENCE ERROR?
015632  001020                                  BNE     TST176-10       ;BR TO ERROR HALT ON SEQ ERROR
015634  012737  125652  000000                  MOV     #125652,@#0     ;MOVE TEST PATTERN TO LOC. 0
015642  012700  000002                          MOV     #2,R0           ;SET UP REGISTER POINTER
015646  000340                                  SWAB    -(R0)           ;TRY SWAB MODE 4
015650  022737  125253  000000                  CMP     #125253,@#0     ;CHECK RESULT
015656  001404                                  BEQ     SB4
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 765            <====
015660  012742  000401                          MOV     #401,-(R2)      ;MOVE TO MAILBOX #  *******  401   *******
015664  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
015666  000000                                  HALT                    ;RESULT OF SWAB INCORRECT
015670  005700                          SB4:    TST     R0              ;CHECK EFFECT ON REG.
015672  001404                                  BEQ     TST176
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 757            <====
015674  012742  000402                          MOV     #402,-(R2)      ;MOVE TO MAILBOX #  *******  402   *******
015700  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
015702  000000                                  HALT                    ;REGISTER VALUE INCORRECT
                                                                        ;  OR SEQUENCE ERROR


                                        ;*****************************************************************************
                                        ;
                                        ;       THIS TEST VERIFIES MODE 5 SWAB INSTRUCTION.  THE TEST USES
                                        ;TWO LOCATIONS FOLLOWING THE TEST CODE.  SB5X HOLDS THE DATA;
                                        ;SB5XAD IS A POINTER TO THE DATA LOCATION.  THE DATA IS MOVED TO
                                        ;SB5X AND R0 IS SET TO TWO PLUS THE ADDRESS OF SB5XAD.  FOLLOWING
                                        ;THE MODE 5 SWAB SB5X IS CHECKED FOR THE PROPER DATA.  R0 IS
                                        ;CHECKED TO SEE THAT IT WAS DECREMENTED PROPERLY.
                                        ;
                                        ;*****************************************************************************
                                        ;TEST 176        TEST MODE 5 W/ SWAB INST.
                                        ;*****************************************************************************
015704  005212                          TST176: INC     (R2)            ;UPDATE TEST NUMBER
015706  022712  000176                          CMP     #176,(R2)       ;SEQUENCE ERROR?
015712  001021                                  BNE     SB5             ;BR TO ERROR HALT ON SEQ ERROR
015714  012700  015772                          MOV     #SB5XAD+2,R0    ;SET UP POINTER TO WORK LOCATION
015720  012767  125125  000040                  MOV     #125125,SB5X    ;MOVE PATTERN TO WORK LOCATION
015726  000350                                  SWAB    @-(R0)          ;TRY SWAB MODE 5
015730  022767  052652  000030                  CMP     #52652,SB5X     ;CHECK RESULT
015736  001404                                  BEQ     SB5A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;               WHICH FOLLOWS W/ 765            <====
015740  012742  000403                          MOV     #403,-(R2)      ;MOVE TO MAILBOX #  *******  403  *******
015744  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
015746  000000                                  HALT                    ;RESULT OF SWAB INCORRECT
015750  020027  015770                  SB5A:   CMP     R0,#SB5XAD      ;CHECK RESULT OF REG.
015754  001406                                  BEQ     TST177

                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS        <====
                                                                        ;               CONDITIONAL BRANCH INST. AND    <====
                                                                        ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;               WHICH FOLLOWS W/ 756            <====
015756                                  SB5:
015756  012742  000404                          MOV     #404,-(R2)      ;MOVE TO MAILBOX #  *******  404  *******
015762  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
015764  000000                                  HALT                    ;REGISTER VALUE INCORRECT
                                                                        ;  OR SEQUENCE ERROR
015766  000000                          SB5X:   0                       ;WORK LOCATION
015770  015766                          SB5XAD: SB5X


                                        ;*******************************************************************************
                                        ;
                                        ;       THIS TEST VERIFIES MODE 6 SWAB INSTRUCTION.  THIS TEST
                                        ;USES A WORK LOCATION (SB6X) FOLLOWING THE TEST CODE.  TEST DATA
                                        ;IS LOADED INTO THE WORK LOCATION.  R0, THE ADDRESSING REGISTER
                                        ;IS LOADED WITH 6 LESS THEN THE ADDRESS OF THE WORK LOCATION.
                                        ;THE MODE 6 SWAB IS EXECUTED WITH A +6 OFFSET.  THE DATA IS
                                        ;VERIFIED WITH A COMPARE.
                                        ;
                                        ;*******************************************************************************
                                        ;TEST 177       TEST MODE 6 W/ SWAB INST.
                                        ;*******************************************************************************
015772  005212                          TST177: INC     (R2)            ;UPDATE TEST NUMBER
015774  022712  000177                          CMP     #177,(R2)       ;SEQUENCE ERROR?
016000  001013                                  BNE     SB6             ;BR TO ERROR HALT ON SEQ ERROR
016002  012767  125125  000030                  MOV     #125125,SB6X    ;MOVE PATTERN TO WORK LOCATION
016010  012700  016032                          MOV     #SB6X-6,R0      ;MOVE OFFSET POINTER TO R0
016014  000360  000006                          SWAB    6(R0)           ;TRY SWAB W/ MODE 6
016020  022760  052652  000006                  CMP     #52652,6(R0)    ;CHECK RESULT
016026  001405                                  BEQ     TST200
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS        <====
                                                                        ;               CONDITIONAL BRANCH INST. AND    <====
                                                                        ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;               WHICH FOLLOWS W/ 764            <====
016030                                  SB6:
016030  012742  000405                          MOV     #405,-(R2)      ;MOVE TO MAILBOX #  *******  405  *******
016034  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
016036  000000                                  HALT                    ;RESULT OF SWAB INCORRECT
                                                                        ;  OR SEQUENCE ERROR
016040  000000                          SB6X:   0                       ;WORK LOCATION


                                        ;*******************************************************************************
                                        ;
                                        ;       THIS TEST VERIFIES MODE 7 SWAB INSTRUCTION.  THIS TEST
                                        ;USES TWO LOCATIONS FOLLOWING THE TEST CODE:  A WORK LOCATION
                                        ;(SB7X) AND A POINTER TO THE WORK LOCATION (SB7XAD).  DATA IS MOVED
```

```
                                      ;TO THE WORK LOCATION.  R0 IS LOADED WITH 72 LESS THAN THE ADDRESS
                                      ;OF THE ADDRESS POINTER.  THE DATA IS SWAB'ED USING A MODE 7
                                      ;INSTRUCTION WITH AN OFFSET OF +72.  THE DATA IS VERIFIED WITH A
                                      ;COMPARE.
                                      ;
                                      ;*******************************************************************************
                                      ;TEST 200        TEST MODE 7 W/ SWAB INST.
                                      ;*******************************************************************************
 016042  005212                       TST200: INC     (R2)            ;UPDATE TEST NUMBER
 016044  022712  000200                       CMP     #200,(R2)       ;SEQUENCE ERROR?
 016050  001013                               BNE     SB7             ;BR TO ERROR HALT ON SEQ ERROR
 016052  012767  177400  000030               MOV     #177400,SB7X    ;MOVE PATTERN TO WORK LOCATION
 016060  012700  016020                       MOV     #SB7XAD-72,R0   ;MOVE OFFSET POINTER TO R0
 016064  000370  000072                       SWAB    @72(R0)         ;TRY SWAB MODE 7
 016070  027027  000072  000377               CMP     @72(R0),#377    ;CHECK RESULTS
 016076  001406                               BEQ     TST201
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 764           <====
 016100                               SB7:
 016100  012742  000406                       MOV     #406,-(R2)      ;MOVE TO MAILBOX #  *******  406  *******
 016104  005242                               INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
 016106  000000                               HALT                    ;RESULT OF SWAB INCORRECT
                                                                      ;  OR SEQUENCE ERROR
 016110  000000                       SB7X:   0                       ;WORK LOCATION
 016112  016110                       SB7XAD: SB7X                    ;POINTER TO WORK LOCATION


                                      ;*******************************************************************************
                                      ;
                                      ;       THIS TEST VERIFIES ALL LEGAL MODES OF THE JMP INSTRUCTION.
                                      ;BECAUSE OF THE NATURE OF THE INSTRUCTION UNDER TEST, THIS TEST
                                      ;UTILIZES SEVERAL DIFFERENT TECHNIQUES.  THE CODE IS NOT EXECUTED
                                      ;IN A LINEAR FASHION.  THE DIFFERENT MODES ARE EXECUTED IN ORDER
                                      ;FROM 1-7; HOWEVER, THE CODE IS ARRANGED SO THAT CONTROL LEAP
                                      ;FROGS THRU THE TEST CODE.  THE ORDER OF APPEARANCE OF THE CODE
                                      ;IS:
                                      ;       JMP MODE 1
                                      ;       JMP MODE 3
                                      ;       JMP MODE 2
                                      ;       JMP MODE 4
                                      ;       JMP MODE 6
                                      ;       JMP MODE 5
                                      ;       JMP MODE 7
                                      ;AN INTERNAL SEQUENCE TEST (JMPSEQ) IS USED TO INSURE THAT THE
                                      ;JUMPS ARE OCCURRING IN THE PROGRAMMED SEQUENCE.
                                      ;       THE TEST IS MADE UP OF SEVERAL BLOCKS OF CODE.  EACH CODE
                                      ;BEGINS WITH A LABEL WHICH INDICATES THE MODE BEING EXECUTED IN
                                      ;THAT BLOCK.  A SIMPLE PROCEDURE IS FOLLOWED IN EACH BLOCK.  FOR
                                      ;EXAMPLE THE CODE BEGINNING AT JMP3 WILL FIRST COMPARE THE RESULTS
                                      ;OF THE PREVIOUS MODE 2 JUMP.  (ANY REGISTER CHANGES ARE VERIFIED
                                      ;AND THE SEQUENCE CHECK IS MADE).  THEN THE REGISTERS ARE SETUP
                                      ;FOR A MODE 3 JUMP TO THE NEXT TEST BLOCK (HERE, JMP4), THE SEQUENCE
                                      ;CHECKER IS UPDATED AND THE JUMP IS EXECUTED.
                                      ;       IF A FAILURE OCCURS, THE SEQUENCE CHECKER WILL ASSIST IN
                                      ;DETERMINING JUST WHICH MODE FAILED.  IF THE SEQUENCE IS CORRECT
```

```
   2634                                         ;THEN THE ERROR DETECTED WAS A MODE FAILURE (E.G. FAILURE OF THE
   2635                                         ;REGISTER TO BE INCREMENTED IN MODE 2 JUMP.)
   2636                                         ;
   2637                                         ;*******************************************************************************
                                                ;TEST 201        TEST THE JMP INSTRUCTION IN ALL MODES
                                                ;*******************************************************************************
        016114  005212                          TST201: INC     (R2)            ;UPDATE TEST NUMBER
        016116  022712  000201                          CMP     #201,(R2)       ;SEQUENCE ERROR?
        016122  001150                                  BNE     JMPCK+6         ;BR TO ERROR HALT ON SEQ ERROR
   2638 016124  005067  000326                          CLR     JMPSEQ          ;ESTABLISH A SEQUENCE CHECKER
   2639 016130  012700  016210                          MOV     #JMP2,R0        ;SET R0=JUMP TARGET
   2640 016134  000110                                  JMP     (R0)            ;TRY JMP MODE 1
   2641 016136  022700  016140                  JMP3:   CMP     #.+2,R0         ;CHECK RESULT OF MODE 2 JUMP
   2642 016142  001404                                  BEQ     JMP3A
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                                ;           WHICH FOLLOWS W/ 767             <====
        016144  012742  000407                          MOV     #407,-(R2)      ;MOVE TO MAILBOX #  *******  407  *******
        016150  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        016152  000000                                  HALT                    ;REGISTER VALUE AFTER JMP MODE 2 INCORRECT
   2643 016154  026727  000276  000001  JMP3A:  CMP     JMPSEQ,#1       ;MAKE SURE JMPS ARE IN SEQUENCE: JMPSEQ=1?
   2644 016162  001404                                  BEQ     JMP3B
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                                ;           WHICH FOLLOWS W/ 757             <====
        016164  012742  000410                          MOV     #410,-(R2)      ;MOVE TO MAILBOX #  *******  410  *******
        016170  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        016172  000000                                  HALT                    ;SHOULD BE HERE FROM JMP MODE 2 ONLY
   2645 016174  012700  016206                  JMP3B:  MOV     #IJMP4,R0       ;POINT R0 TO INDIRECT JMP ADDR.
   2646 016200  005267  000252                          INC     JMPSEQ          ;UPDATE SEQUENCE CHECKER
   2647 016204  000130                                  JMP     @(R0)+          ;TRY JMP MODE 3
   2648 016206  016240                          IJMP4:  JMP4                    ;ADDRESS INDIRECT JUMP
   2649
   2650 016210  005767  000242                  JMP2:   TST     JMPSEQ          ;CHECK THAT JMPS ARE IN SEQUENCE: JMPSEQ=0?
   2651 016214  001404                                  BEQ     JMP2A
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                                ;           WHICH FOLLOWS W/ 742             <====
        016216  012742  000411                          MOV     #411,-(R2)      ;MOVE TO MAILBOX #  *******  411  *******
        016222  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        016224  000000                                  HALT                    ;SHOULD BE HERE FROM JMP MODE 1 ONLY
   2652 016226  005267  000224                  JMP2A:  INC     JMPSEQ          ;UPDATE SEQUENCE CHECKER
   2653 016232  012700  016136                          MOV     #JMP3,R0        ;SET R0=JUMP TARGET
Z  2654 016236  000120                                  JMP     (R0)+           ;TRY A JUMP MODE 2 TO "JMP3"
   2655 016240  022700  016210                  JMP4:   CMP     #IJMP4+2,R0     ;CHECK RESULT OF REGISTER IN MODE 3 JUMP
   2656 016244  001404                                  BEQ     JMP4A
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                                ;           WHICH FOLLOWS W/ 726             <====
        016246  012742  000412                          MOV     #412,-(R2)      ;MOVE TO MAILBOX #  *******  412  *******
        016252  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        016254  000000                                  HALT                    ;REGISTER VALUE AFTER MODE 3 JUMP INCORRECT
   2657 016256  022767  000002  000172  JMP4A:  CMP     #2,JMPSEQ       ;CHECK JUMP SEQUENCE: JMPSEQ=2?
```

```
  2658 016264  001404                           BEQ     JMP4B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 716            <====
       016266  012742  000413                   MOV     #413,-(R2)      ;MOVE TO MAILBOX #  *******  413  *******
       016272  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       016274  000000                           HALT                    ;SHOULD BE ONLY FROM MODE 3 JUMP
  2659 016276  012700  016346          JMP4B:   MOV     #JMP5+2,R0      ;SET UP POINTER TO JUMP TARGET
  2660 016302  005267  000150                   INC     JMPSEQ          ;UPDATE SEQUENCE CHECKER
  2661 016306  000140                           JMP     -(R0)           ;TRY JUMP MODE 4 TO ''JMP4''
  2662
  2663 016310  022767  000004  000140  JMP6:    CMP     #4,JMPSEQ       ;CHECK THAT JUMPS ARE IN SEQUENCE: JMPSEQ=4?
  2664 016316  001404                           BEQ     JMP6A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 701            <====
       016320  012742  000414                   MOV     #414,-(R2)      ;MOVE TO MAILBOX #  *******  414  *******
       016324  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       016326  000000                           HALT                    ;SHOULD BE HERE ONLY FROM MODE 5 JUMP
  2665 016330  012700  016776          JMP6A:   MOV     #JMP7+376,R0    ;SET UP OFFSET POINTER TO JUMP TARGET
  2666 016334  005267  000116                   INC     JMPSEQ          ;UPDATE JUMP SEQUENCE
  2667 016340  000160  177402                   JMP     -376(R0)        ;TRY MODE 6 JUMP
  2668
  2669 016344  022767  000003  000104  JMP5:    CMP     #3,JMPSEQ       ;CHECK THAT JUMPS ARE IN SEQUENCE: JMPSEQ=3?
  2670 016352  001404                           BEQ     JMP5A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 663            <====
       016354  012742  000415                   MOV     #415,-(R2)      ;MOVE TO MAILBOX #  *******  415  *******
       016360  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       016362  000000                           HALT                    ;SHOULD ONLY BE HERE FROM MODE 4 JUMP
  2671 016364  012700  016400          JMP5A:   MOV     #IJMP5+2,R0     ;SET UP POINTER TO INDIRECT JUMP ADDR.
  2672 016370  005267  000062                   INC     JMPSEQ          ;UPDATE JUMP SEQUENCE
  2673 016374  000150                           JMP     @-(R0)          ;TRY JUMP MODE 5 TO ''JMP6''
  2674 016376  016310                  IJMP5:   JMP6                    ;INDIRECT ADDRESS POINTER
  2675
  2676 016400  022767  000005  000050  JMP7:    CMP     #5,JMPSEQ       ;CHECK JUMPS IN SEQUENCE: JMPSEQ=5?
  2677 016406  001404                           BEQ     JMP7A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 645            <====
       016410  012742  000416                   MOV     #416,-(R2)      ;MOVE TO MAILBOX #  *******  416  *******
       016414  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       016416  000000                           HALT                    ;SHOULD ONLY BE HERE FROM MODE 6 JUMP
  2678 016420  012700  016444          JMP7A:   MOV     #IJMP+10,R0     ;SET UP OFFSET POINTER TO INDIRECT ADDR.
  2679 016424  005267  000026                   INC     JMPSEQ          ;UPDATE JUMP SEQUENCE
  2680 016430  000170  177770                   JMP     @-10(R0)        ;TRY MODE 7 JUMP
  2681 016434  016436                  IJMP:    JMPCK                   ;INDIRECT ADDRESS
  2682
  2683 016436  026727  000014  000006  JMPCK:   CMP     JMPSEQ,#6       ;CHECK JUMPS IN SEQUENCE: JMPSEQ
  2684 016444  001405                           BEQ     TST202
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                  ;              REPLACE THE MOVE INSTRUCTION    <====
                                                                  ;              WHICH FOLLOWS W/ 626            <====
 016446  012742  000417                  MOV     #417,-(R2)       ;MOVE TO MAILBOX #  *******  417  *******
 016452  005242                          INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
 016454  000000                          HALT                     ;SHOULD ONLY BE HERE FROM MODE 6 JUMP
                                                                  ;  OR SEQUENCE ERROR
 016456  000000                  JMPSEQ: 0

                                 ;*******************************************************************************
                                 ;
                                 ;       THIS TEST VERIFIES ALL LEGAL MODES OF THE JSR INSTRUCTION.
                                 ;THE CONCEPT OF LEAP FROGGING AND SEQUENCE CHECKING (JSRSEQ) IS
                                 ;IDENTICAL TO THAT USED IN JMP TEST (SEE PREVIOUS TEST).  EACH
                                 ;BLOCK OF CODE VERIFIES THE PREVIOUS JSR BY CHECKING THE SEQUENCE,
                                 ;CHECKING THAT THE PC WAS SAVED IN THE SPECIFIED REGISTER, CHECKING
                                 ;THAT THE SP WAS DECREMENTED, CHECKING THAT THE REGISTER WAS
                                 ;SAVED ON THE STACK, AND FINALLY CHECKING THAT ANY MODE ADDRESS
                                 ;REGISTER ALTERATIONS (E.G. INCREMENT REGISTER IN MODE 2) WERE
                                 ;SUCCESSFUL.  R1 IS USED AS THE REGISTER IN ALL JSR INSTRUCTIONS.
                                 ;       IF A FAILURE OCCURS, THE SEQUENCE CHECKER WILL ASSIST IN
                                 ;DETERMINING JUST WHICH MODE FAILED.  IF THE SEQUENCE IS CORRECT
                                 ;THEN THE ERROR DETECTED WAS A FUNCTIONAL FAILURE (E.G., INCORRECT
                                 ;REGISTER SAVED).
                                 ;
                                 ;*******************************************************************************
                                 ;TEST 202        TEST JSR INSTRUCTION W/ ALL MODES
                                 ;*******************************************************************************
 016460  005212                  TST202: INC     (R2)             ;UPDATE TEST NUMBER
 016462  022712  000202                  CMP     #202,(R2)        ;SEQUENCE ERROR?
 016466  001001                          BNE     JSR0             ;BR TO ERROR HALT ON SEQ ERROR
 016470  000402                          BR      JSR1
 016472  000137  017126          JSR0:   JMP     @#JSRCK1

 016476  012706  001000          JSR1:   MOV     #STBOT,R6        ;SET STACK POINTER
 016502  012700  016610                  MOV     #JSR2,R0         ;SET TARGET ADDRESS
 016506  005037  017106                  CLR     @#JSRSEQ         ;INITIALIZE SEQUENCE CHECKER
 016512  005001                          CLR     R1               ;INITIALIZE R1
 016514  005101                          COM     R1
 016516  004110                          JSR     R1,(R0)          ;TRY JSR MODE 1
                                                                  ; TO SCOPE: REPLACE THE MOVE INSTRUCTION    <====
                                                                  ;              FOLLOWING W/ 774              <====
 016520                          JSR1A:
 016520  012742  000420                  MOV     #420,-(R2)       ;MOVE TO MAILBOX #  *******  420  *******
 016524  005242                          INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
 016526  000000                          HALT                     ;JSR MODE 1 FAILED

 016530  022737  000001  017106  JSR3:   CMP     #1,@# JSRSEQ     ;CHECK SEQUENCE: JSRSEQ=1?
 016536  001014                          BNE     JSR3A            ;BRANCH IF OUT OF SEQUENCE
 016540  020127  016672                  CMP     R1,#JSR4         ;PROPER PC SAVED?
 016544  001011                          BNE     JSR3A            ;BRANCH IF PC WRONG
 016546  022706  000776                  CMP     #STBOT-2,R6      ;STACK POINTER DECREMENTED?
 016552  001006                          BNE     JSR3A            ;BRANCH IF SP WRONG
 016554  022716  125252                  CMP     #125252,(R6)     ;REG SAVED ON STACK?
 016560  001003                          BNE     JSR3A            ;BRANCH IF REG. NOT SAVED
 016562  022700  016532                  CMP     #JSR3+2,R0       ;MODE 2 INCREMENT CORRECT?
 016566  001404                          BEQ     JSR3B
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 737            <====
  016570                               JSR3A:
  016570  012742  000421                       MOV     #421,-(R2)      ;MOVE TO MAILBOX #  *******  421  *******
  016574  005242                               INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
  016576  000000                               HALT                    ;JSR MODE 3 MALFUNCTIONED
  016600  005237  017106               JSR3B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
  016604  004137  016672                       JSR     R1,@#JSR4       ;TRY JSR MODE 4

  016610  005737  017106               JSR2:   TST     @#JSRSEQ        ;CHECK SEQUENCE: JSRSEQ=0?
  016614  001011                               BNE     JSR2A           ;BRANCH IF OUT OF SEQUENCE
  016616  020127  016520                       CMP     R1,#JSR1A       ;PROPER PC SAVED?
  016622  001006                               BNE     JSR2A           ;BRANCH IF PC WRONG
  016624  022706  000776                       CMP     #STBOT-2,R6     ;R6 DECREMENT?
  016630  001003                               BNE     JSR2A           ;BRANCH IF R6 IS INCORRECT
  016632  021627  177777                       CMP     (R6),#-1        ;REGISTER SAVED?
  016636  001404                               BEQ     JSR2B
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 713            <====
  016640                               JSR2A:
  016640  012742  000422                       MOV     #422,-(R2)      ;MOVE TO MAILBOX #  *******  422  *******
  016644  005242                               INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
  016646  000000                               HALT                    ;JSR MODE 1 MALFUNCTIONED
  016650  012706  001000               JSR2B:  MOV     #STBOT,R6       ;INITIALIZE R6
  016654  012701  125252                       MOV     #125252,R1      ;INITIALIZE R1
  016660  005237  017106                       INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
  016664  012700  016530                       MOV     #JSR3,R0        ;SET TARGET ADDRESS
Z 016670  004120                               JSR     R1,(R0)+        ;TRY JSR MODE 2

  016672  022737  000002  017106       JSR4:   CMP     #2,@#JSRSEQ     ;CHECK SEQUENCE: JSRSEQ=2?
  016700  001003                               BNE     JSR4A           ;BRANCH IF OUT OF SEQUENCE
  016702  022701  016610                       CMP     #JSR2,R1        ;PROPER PC SAVED?
  016706  001404                               BEQ     JSR4B
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 667            <====
  016710                               JSR4A:
  016710  012742  000423                       MOV     #423,-(R2)      ;MOVE TO MAILBOX #  *******  423  *******
  016714  005242                               INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
  016716  000000                               HALT                    ;JSR MODE 3 MALFUNCTIONED
  016720  005237  017106               JSR4B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
  016724  012700  017000                       MOV     #JSR5+2,R0      ;SET TARGET ADDRESS
  016730  004140                               JSR     R1,-(R0)        ;TRY JSR MODE 4

  016732  022767  000004  000146       JSR6:   CMP     #4,JSRSEQ       ;CHECK SEQUENCE: JSRSEQ=4?
  016740  001006                               BNE     JSR6A           ;BRANCH IF OUT OF SEQUENCE
  016742  022701  017044                       CMP     #JSR7,R1        ;PROPER PC SAVED?
  016746  001003                               BNE     JSR6A           ;BRANCH IF PC WRONG
  016750  022700  017102                       CMP     #JSR6AD,R0      ;MODE 5 REGISTER CORRECT?
  016754  001404                               BEQ     JSR6B
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;               WHICH FOLLOWS W/ 644             <====
016756                                  JSR6A:
016756  012742  000424                          MOV     #424,-(R2)      ;MOVE TO MAILBOX #  *******  424  *******
016762  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
016764  000000                                  HALT                    ;JSR MODE 5 FAILED
016766  005237  017106                  JSR6B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
016772  004167  000046                          JSR     R1,JSR7         ;TRY JSR MODE 6
016776  022767  000003  000102          JSR5:   CMP     #3,JSRSEQ       ;CHECK SEQUENCE: JSRSEQ=3?
017004  001006                                  BNE     JSR5A           ;BRANCH IF OUT OF SEQUENCE
017006  022701  016732                          CMP     #JSR6,R1        ;PROPER PC SAVED?
017012  001003                                  BNE     JSR5A           ;BRANCH IF PC WRONG
017014  022700  016776                          CMP     #JSR5,R0        ;CHECK MODE 4 REGISTER
017020  001404                                  BEQ     JSR5B
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS         <====
                                                                ;               CONDITIONAL BRANCH INST. AND     <====
                                                                ;               REPLACE THE MOVE INSTRUCTION     <====
                                                                ;               WHICH FOLLOWS W/ 622             <====
017022                                  JSR5A:
017022  012742  000425                          MOV     #425,-(R2)      ;MOVE TO MAILBOX #  *******  425  *******
017026  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
017030  000000                                  HALT                    ;JSR MODE 4 MALFUNCTIONED
017032  005237  017106                  JSR5B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
017036  012700  017104                          MOV     #JSR6AD+2,R0    ;POINT R0 TO TARGET ADDRESS
017042  004150                                  JSR     R1,@-(R0)       ;TRY JSR MODE 5

017044  022737  000005  017106          JSR7:   CMP     #5,@#JSRSEQ     ;CHECK SEQUENCE: JSRSEQ=5?
017052  001003                                  BNE     JSR7A           ;BRANCH IF OUT OF SEQUENCE
017054  022701  016776                          CMP     #JSR5,R1        ;PROPER PC SAVED?
017060  001404                                  BEQ     JSR7B
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS         <====
                                                                ;               CONDITIONAL BRANCH INST. AND     <====
                                                                ;               REPLACE THE MOVE INSTRUCTION     <====
                                                                ;               WHICH FOLLOWS W/ 602             <====
017062                                  JSR7A:
017062  012742  000426                          MOV     #426,-(R2)      ;MOVE TO MAILBOX #  *******  426  *******
017066  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
017070  000000                                  HALT                    ;JSR MODE 6 FAILED
017072  005237  017106                  JSR7B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
017076  004177  000002                          JSR     R1,@JSRCKAD     ;TRY JSR MODE 7

017102  016732                          JSR6AD: JSR6                    ;MODE 5 TARGET ADDRESS
017104  017110                          JSRCKAD:JSRCK                   ;MODE 7 TARGET ADDRESS
017106  000000                          JSRSEQ: 0                       ;SEQUENCE CHECKER

017110  022767  000006  177770          JSRCK:  CMP     #6,JSRSEQ       ;CHECK SEQUENCE: JSRSEQ=6?
017116  001003                                  BNE     JSRCK1          ;BRANCH IF OUT OF SEQUENCE
017120  022701  017102                          CMP     #JSR6AD,R1      ;PROPER PC SAVED?
017124  001404                                  BEQ     TST203
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS         <====
                                                                ;               CONDITIONAL BRANCH INST. AND     <====
                                                                ;               REPLACE THE MOVE INSTRUCTION     <====
                                                                ;               WHICH FOLLOWS W/ 560             <====
017126                                  JSRCK1:
017126  012742  000427                          MOV     #427,-(R2)      ;MOVE TO MAILBOX #  *******  427  *******
017132  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
017134  000000                                  HALT                    ;JSR MODE 7 MALFUNCTIONED
                                                                ;  OR SEQUENCE ERROR
```

```
                                ;*************************************************************************************
                                ;
                                ;       THIS TEST VERIFIES THE RTS INSTRUCTION.  THE STACK POINTER
                                ;IS INITIALIZED AND A TEST PATTERN STORED ON STACK.  RO IS LOADED
                                ;WITH RETURN ADDRESS.  AN RTS IS EXECUTED, AND, AT THE TARGET
                                ;ADDRESS, A CHECK IS MADE THAT RO WAS PROPERLY RESTORED FROM THE
                                ;STACK.
                                ;*************************************************************************************
                                ;TEST 203        TEST RTS INSTRUCTION
                                ;*************************************************************************************
017136  005212                  TST203: INC     (R2)            ;UPDATE TEST NUMBER
017140  022712  000203                  CMP     #203,(R2)       ;SEQUENCE ERROR?
017144  001016                          BNE     TST204-10       ;BR TO ERROR HALT ON SEQ ERROR
017146  012706  001000                  MOV     #STBOT,R6       ;INITIALIZE STACK POINTER
017152  012746  052525                  MOV     #52525,-(R6)    ;INITIALIZE TOP OF STACK
017156  012700  017174                  MOV     #RTS1,RO        ;INITIALIZE RETURN REGISTER
017162  000200                          RTS     RO              ;TRY RTS THROUGH RO
                                                                ; TO SCOPE: REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           FOLLOWING W/ 770                <====
017164  012742  000430                  MOV     #430,-(R2)      ;MOVE TO MAILBOX #  *******  430  *******
017170  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
017172  000000                          HALT                    ;RTS FAILED
017174  022700  052525          RTS1:   CMP     #52525,RO       ;CHECK THAT RO RESTORED FROM STACK
017200  001404                          BEQ     TST204
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                ;           CONDITIONAL BRANCH INST. AND      <====
                                                                ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                ;           WHICH FOLLOWS W/ 761              <====
017202  012742  000431                  MOV     #431,-(R2)      ;MOVE TO MAILBOX #  *******  431  *******
017206  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
017210  000000                          HALT                    ;RTS MALFUNCTIONED
                                                                ;  OR SEQUENCE ERROR
                                ;*************************************************************************************
                                ;
                                ;       THESE NEXT FOUR TESTS VERIFY THE FUNCTIONING OF A GROUP
                                ;OF FOUR INSTRUCTIONS.  THE GROUP CONSISTS OF THE INSTRUCTIONS:
                                ;MOV, BIC, BIT, AND BIS.  THESE INSTRUCTIONS ARE SIMILAR IN THE
                                ;WAY THEY EFFECT THE C AND V BITS.  THEY ALL LEAVE THE V-BIT
                                ;CLEAR AND THE C-BIT UNAFFECTED.
                                ;       THE TEST PROCEDURE IS AS FOLLOWS:  THE N, Z, AND V BITS
                                ;ARE LOADED WITH THE COMPLEMENT OF THE EXPECTED RESULTS, THE C-BIT
                                ;IS LOADED WITH THE DESIRED RESULT.  THE INSTRUCTION IS EXECUTED
                                ;WITH DIFFERENT DATA PATTERNS AND THE RESULTS ARE VERIFIED WITH
                                ;A SERIES OF CONDITIONAL BRANCH INSTRUCTIONS.  THE DATA IS CHOSEN
                                ;TO PRODUCT ALL POSSIBLE COMBINATIONS OF THE C AND V BITS.
                                ;
                                ;**********************************************************************
                                ;TEST 204        TEST MOV INSTRUCTION
                                ;**********************************************************************
     017212  005212             TST204: INC     (R2)            ;UPDATE TEST NUMBER
     017214  022712  000204             CMP     #204,(R2)       ;SEQUENCE ERROR?
     017220  001022                     BNE     TST205-10       ;BR TO ERROR HALT ON SEQ ERROR
     017222  000277                     SCC                     ;CC=0110
     017224  000251                     +CLN!CLC
     017226  012700  100000             MOV     #100000,R0      ;CC=1000
     017232  101402                     BLOS    MOV1
     017234  102401                     BVS     MOV1
     017236  100404                     BMI     MOV2
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;          CONDITIONAL BRANCH INST. AND    <====
                                                                ;          REPLACE THE MOVE INSTRUCTION    <====
                                                                ;          WHICH FOLLOWS W/ 770            <====
     017240                     MOV1:
     017240  012742  000432             MOV     #432,-(R2)      ;MOVE TO MAILBOX #  *******  432  *******
     017244  005242                     INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     017246  000000                     HALT                    ;MOV DID NOT SET CC'S CORRECTLY

     017250  000277             MOV2:   SCC                     ;CC=1011
     017252  000244                     CLZ
     017254  012700  000000             MOV     #0,R0           ;CC=0101
     017260  101002                     BHI     MOV3            ;C OR Z = 0?
     017262  102401                     BVS     MOV3            ;V=1?
     017264  100004                     BPL     TST205
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;          CONDITIONAL BRANCH INST. AND    <====
                                                                ;          REPLACE THE MOVE INSTRUCTION    <====
                                                                ;          WHICH FOLLOWS W/ 755            <====
     017266                     MOV3:
     017266  012742  000433             MOV     #433,-(R2)      ;MOVE TO MAILBOX #  *******  433  *******
     017272  005242                     INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     017274  000000                     HALT                    ;MOV DID NOT SET CC'S CORRECTLY
                                                                ;  OR SEQUENCE ERROR
                                ;**********************************************************************
                                ;TEST 205        TEST BIT INSTRUCTION
                                ;**********************************************************************
     017276  005212             TST205: INC     (R2)            ;UPDATE TEST NUMBER
     017300  022712  000205             CMP     #205,(R2)       ;SEQUENCE ERROR?
     017304  001024                     BNE     TST206-10       ;BR TO ERROR HALT ON SEQ ERROR
     017306  012700  100001             MOV     #100001,R0
     017312  000277                     SCC                     ;CC=0110
```

```
  2836 017314  000251                           +CLN!CLC
  2837 017316  032700  100000                   BIT     #100000,R0          ;CC=1000
  2838 017322  101402                           BLOS    XBIT1
  2839 017324  102401                           BVS     XBIT1
  2840 017326  100404                           BMI     XBIT2
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 766            <====
       017330                           XBIT1:
       017330  012742  000434                   MOV     #434,-(R2)          ;MOVE TO MAILBOX #  *******  434  *******
       017334  005242                           INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
       017336  000000                           HALT                        ;BIT DID NOT SET CC'S CORRECTLY
  2841
  2842 017340  000277                   XBIT2:  SCC                         ;CC=1011
  2843 017342  000244                           CLZ
  2844 017344  032700  077776                   BIT     #77776,R0           ;CC=0101
  2845 017350  101002                           BHI     XBIT3
  2846 017352  102401                           BVS     XBIT3
  2847 017354  100004                           BPL     TST206
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 753            <====
       017356                           XBIT3:
       017356  012742  000435                   MOV     #435,-(R2)          ;MOVE TO MAILBOX #  *******  435  *******
       017362  005242                           INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
       017364  000000                           HALT                        ;BIT DID NOT SET CC'S CORRECTLY
                                                                            ;  OR SEQUENCE ERROR
  2848                                  ;*******************************************************************************
                                        ;TEST 206       TEST BIC INSTRUCTION
                                        ;*******************************************************************************
       017366  005212                   TST206: INC     (R2)                ;UPDATE TEST NUMBER
       017370  022712  000206                   CMP     #206,(R2)           ;SEQUENCE ERROR?
       017374  001024                           BNE     TST207-10           ;BR TO ERROR HALT ON SEQ ERROR
  2849 017376  012700  177777                   MOV     #177777,R0
  2850 017402  000277                           SCC                         ;CC=0110
  2851 017404  000251                           +CLN!CLC
  2852 017406  042700  077777                   BIC     #77777,R0           ;CC=1000
  2853 017412  101402                           BLOS    BIC1
  2854 017414  102401                           BVS     BIC1
  2855 017416  100404                           BMI     BIC2
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 766            <====
       017420                           BIC1:
       017420  012742  000436                   MOV     #436,-(R2)          ;MOVE TO MAILBOX #  *******  436  *******
       017424  005242                           INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
       017426  000000                           HALT                        ;BIC DID NOT SET CC'S CORRECTLY
  2856 017430  000277                   BIC2:   SCC                         ;CC=1011
  2857 017432  000244                           CLZ
  2858 017434  042700  100000                   BIC     #100000,R0          ;CC=0101
  2859 017440  101002                           BHI     BIC3
  2860 017442  102401                           BVS     BIC3
  2861 017444  100004                           BPL     TST207
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                          ;           CONDITIONAL BRANCH INST. AND     <====
                                                          ;           REPLACE THE MOVE INSTRUCTION     <====
                                                          ;           WHICH FOLLOWS W/ 753             <====
017446                          BIC3:
017446  012742  000437                  MOV     #437,-(R2)      ;MOVE TO MAILBOX #  *******  437  *******
017452  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
017454  000000                          HALT                    ;BIC DID NOT SET CC'S CORRECTLY
                                                                ;  OR SEQUENCE ERROR
                                ;*******************************************************************************
                                ;TEST 207       TEST BIS INSTRUCTION
                                ;*******************************************************************************
017456  005212                  TST207: INC     (R2)            ;UPDATE TEST NUMBER
017460  022712  000207                  CMP     #207,(R2)       ;SEQUENCE ERROR?
017464  001025                          BNE     TST210-10       ;BR TO ERROR HALT ON SEQ ERROR
017466  005000                          CLR     R0              ;R0=0
017470  000277                          SCC                     ;CC=1010
017472  000251                          +CLN!CLC
017474  052700  000000                  BIS     #0,R0           ;CC=0100  R0=0
017500  103403                          BCS     BIS1
017502  102402                          BVS     BIS1
017504  100401                          BMI     BIS1
017506  001404                          BEQ     BIS2
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 766             <====
017510                          BIS1:
017510  012742  000440                  MOV     #440,-(R2)      ;MOVE TO MAILBOX #  *******  440  *******
017514  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
017516  000000                          HALT                    ;BIS DID NOT SET CC'S CORRECTLY
017520  000277                  BIS2:   SCC                     ;CC=0111
017522  000250                          CLN
017524  052700  177777                  BIS     #177777,R0      ;CC=1001
017530  103003                          BCC     BIS3
017532  102402                          BVS     BIS3
017534  001401                          BEQ     BIS3
017536  100404                          BMI     TST210
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 752             <====
017540                          BIS3:
017540  012742  000441                  MOV     #441,-(R2)      ;MOVE TO MAILBOX #  *******  441  *******
017544  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
017546  000000                          HALT                    ;BIS DID NOT SET CC'S CORRECTLY
                                                                ;  OR SEQUENCE ERROR

                                ;*******************************************************************************
                                ;
                                ;       THESE NEXT TWO TESTS VERIFY THE FUNCTIONING OF THE INC AND
                                ;DEC INSTRUCTIONS.  THESE INSTRUCTIONS BOTH EFFECT THE C AND V
                                ;BITS THE SAME; THE C-BIT IS LEFT UNCHANGED AND THE V-BIT IS DEPENDENT
                                ;UPON THE DATA RESULTS.  THE SAME PROCEDURE IS USED.  THE CONDITION
                                ;CODE BITS ARE INITIALIZED, THE INSTRUCTION IS EXECUTED AND THE
                                ;RESULTS ARE VERIFIED WITH A SERIES OF CONDITIONAL BRANCH INSTRUCTIONS.
                                ;THIS PROCEDURE IS REPEATED WITH SEVERAL DATA PATTERNS TO PRODUCE
                                ;DIFFERENT COMBINATIONS OF THE C AND V BITS.
```

```
                                         ;
                                         ;*******************************************************************************
                                         ;TEST 210         TEST INC INSTRUCTION
                                         ;*******************************************************************************
     017550  005212                      TST210: INC      (R2)              ;UPDATE TEST NUMBER
     017552  022712  000210                      CMP      #210,(R2)         ;SEQUENCE ERROR?
     017556  001037                              BNE      TST211-10         ;BR TO ERROR HALT ON SEQ ERROR
     017560  012700  077777                      MOV      #077777,R0        ;R0=077777
     017564  000257                              CCC                        ;CC=0100
     017566  000264                              SEZ
     017570  005200                              INC      R0                ;CC=1010   R0=10000
     017572  101402                              BLOS     INC1
     017574  100001                              BPL      INC1
     017576  102404                              BVS      INC2
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 767            <====
     017600                              INC1:
     017600  012742  000442                      MOV      #442,-(R2)        ;MOVE TO MAILBOX #  *******  442  *******
     017604  005242                              INC      -(R2)             ;SET MSGTYP TO FATAL ERROR
     017606  000000                              HALT                       ;INC DID NOT SET CC'S CORRECTLY
     017610  052700  077777              INC2:   BIS      #77777,R0         ;R0=177777
     017614  000261                              SEC                        ;CC=1011
     017616  000244                              CLZ
     017620  005200                              INC      R0                ;CC=0101   R0=0
     017622  100403                              BMI      INC3
     017624  102402                              BVS      INC3
     017626  103001                              BCC      INC3
     017630  001404                              BEQ      INC4
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 752            <====
     017632                              INC3:
     017632  012742  000443                      MOV      #443,-(R2)        ;MOVE TO MAILBOX #  *******  443  *******
     017636  005242                              INC      -(R2)             ;SET MSGTYP TO FATAL ERROR
     017640  000000                              HALT                       ;INC DID NOT SET CC'S CORRECTLY

     017642  000277                      INC4:   SCC                        ;CC=1110
     017644  000241                              CLC
     017646  005200                              INC      R0                ;CC=0000   R0=1
     017650  101402                              BLOS     INC5
     017652  100401                              BMI      INC5
     017654  100004                              BPL      TST211
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 740            <====
     017656                              INC5:
     017656  012742  000444                      MOV      #444,-(R2)        ;MOVE TO MAILBOX #  *******  444  *******
     017662  005242                              INC      -(R2)             ;SET MSGTYP TO FATAL ERROR
     017664  000000                              HALT                       ;INC DID NOT SET CC'S CORRECTLY
                                                                            ;  OR SEQUENCE ERROR

                                         ;*******************************************************************************
                                         ;TEST 211         TEST DEC INSTRUCTION
```

```
                                        ;*************************************************************************************
     017666  005212                     TST211: INC     (R2)            ;UPDATE TEST NUMBER
     017670  022712  000211                     CMP     #211,(R2)       ;SEQUENCE ERROR?
     017674  001051                             BNE     TST212-10       ;BR TO ERROR HALT ON SEQ ERROR
     017676  012700  000002                     MOV     #2,R0           ;R0=2
     017702  000277                             SCC                     ;CC=1111
     017704  005300                             DEC     R0              ;CC=0001    R0=1
     017706  100403                             BMI     DEC1
     017710  001402                             BEQ     DEC1
     017712  102401                             BVS     DEC1
     017714  103404                             BCS     DEC2
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 767            <====
     017716                             DEC1:
     017716  012742  000445                     MOV     #445,-(R2)      ;MOVE TO MAILBOX #  *******  445  *******
     017722  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     017724  000000                             HALT                    ;DEC DID NOT SET CC'S CORRECTLY
     017726  000261                     DEC2:   SEC                     ;CC=1011
     017730  000244                             CLZ
     017732  005300                             DEC     R0              ;CC=0101    R0=0
     017734  101002                             BHI     DEC3
     017736  100401                             BMI     DEC3
     017740  102004                             BVC     DEC4
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 755            <====
     017742                             DEC3:
     017742  012742  000446                     MOV     #446,-(R2)      ;MOVE TO MAILBOX #  *******  446  *******
     017746  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     017750  000000                             HALT                    ;DEC DID NOT SET CC'S CORRECTLY
     017752  000277                     DEC4:   SCC                     ;CC=0110
     017754  000251                             +CLN!CLC
     017756  005300                             DEC     R0              ;CC=1000    R0=177777
     017760  101402                             BLOS    DEC5
     017762  102401                             BVS     DEC5
     017764  100404                             BMI     DEC6
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 743            <====
     017766                             DEC5:
     017766  012742  000447                     MOV     #447,-(R2)      ;MOVE TO MAILBOX #  *******  447  *******
     017772  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     017774  000000                             HALT                    ;DEC DID NOT SET CC'S CORRECTLY
     017776  042700  077777             DEC6:   BIC     #77777,R0       ;R0=100000
     020002  000277                             SCC                     ;CC=0101
     020004  000252                             +CLN!CLV
     020006  005300                             DEC     R0              ;CC=1011    R0=77777
     020010  100403                             BMI     DEC7            ;CC=0011
     020012  001402                             BEQ     DEC7
     020014  102001                             BVC     DEC7
     020016  103404                             BCS     TST212
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                 ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                 ;               WHICH FOLLOWS W/ 726            <====
      020020                            DEC7:
      020020  012742  000450                     MOV     #450,-(R2)      ;MOVE TO MAILBOX #  *******  450  *******
      020024  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      020026  000000                             HALT                    ;DEC DID NOT SET CC'S CORRECTLY
                                                                         ;  OR SEQUENCE ERROR
 2942
 2943
 2944                                   ;*******************************************************************************
 2945                                   ;
 2946                                   ;       THESE NEXT THREE TESTS VERIFY THE FUNCTIONING OF THE CLR,
 2947                                   ;TST, AND SWAB INSTRUCTIONS.  THESE THREE INSTRUCTIONS ALL LEAVE
 2948                                   ;THE C AND V BITS CLEARED.  AGAIN, THE CONDITION CODES ARE PRESET,
 2949                                   ;THE INSTRUCTION EXECUTED AND THE RESULTS CHECKED WITH CONDITIONAL
 2950                                   ;BRANCH INSTRUCTIONS.  THE PROCEDURE IS REPEATED TO PRODUCE OTHER
 2951                                   ;COMBINATIONS OF CONDITION CODES.
 2952                                   ;
 2953                                   ;*******************************************************************************
                                        ;TEST 212        TEST CLR INSTRUCTION
                                        ;*******************************************************************************
      020030  005212                    TST212: INC      (R2)            ;UPDATE TEST NUMBER
      020032  022712  000212                     CMP     #212,(R2)       ;SEQUENCE ERROR?
      020036  001007                             BNE     TST213-10       ;BR TO ERROR HALT ON SEQ ERROR
 2954 020040  000277                             SCC                     ;CC=1011
 2955 020042  000244                             CLZ
 2956 020044  005000                             CLR     R0              ;CC=0100   R0=0
 2957 020046  100403                             BMI     CLR1
 2958 020050  102402                             BVS     CLR1
 2959 020052  103401                             BCS     CLR1
 2960 020054  001404                             BEQ     TST213
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS        <====
                                                                 ;               CONDITIONAL BRANCH INST. AND    <====
                                                                 ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                 ;               WHICH FOLLOWS W/ 770            <====
      020056                            CLR1:
      020056  012742  000451                     MOV     #451,-(R2)      ;MOVE TO MAILBOX #  *******  451  *******
      020062  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      020064  000000                             HALT                    ;CLR DID NOT SET CC'S CORRECTLY
                                                                         ;  OR SEQUENCE ERROR
 2961
 2962                                   ;*******************************************************************************
                                        ;TEST 213        TEST TST INSTRUCTION
                                        ;*******************************************************************************
      020066  005212                    TST213: INC      (R2)            ;UPDATE TEST NUMBER
      020070  022712  000213                     CMP     #213,(R2)       ;SEQUENCE ERROR?
      020074  001022                             BNE     TST214-10       ;BR TO ERROR HALT ON SEQ ERROR
 2963 020076  000277                             SCC                     ;CC=1011
 2964 020100  000244                             CLZ
 2965 020102  005700                             TST     R0              ;CC=0100
 2966 020104  100403                             BMI     TEST1
 2967 020106  102402                             BVS     TEST1
 2968 020110  103401                             BCS     TEST1
 2969 020112  001404                             BEQ     TEST2
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS        <====
                                                                 ;               CONDITIONAL BRANCH INST. AND    <====
                                                                 ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                ;          WHICH FOLLOWS W/ 770          <====
020114                          TEST1:
020114  012742  000452                  MOV     #452,-(R2)      ;MOVE TO MAILBOX #  *******  452   *******
020120  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
020122  000000                          HALT                    ;TEST DID NOT SET CC'S CORRECTLY
020124  005300                  TEST2:  DEC     R0              ;MAKE R0 NEGATIVE
020126  000277                          SCC                     ;CC=0111
020130  000250                          CLN
020132  005700                          TST     R0              ;CC=1000
020134  101402                          BLOS    TEST3
020136  102401                          BVS     TEST3
020140  100404                          BMI     TST214
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS  <====
                                                                ;          CONDITIONAL BRANCH INST. AND  <====
                                                                ;          REPLACE THE MOVE INSTRUCTION  <====
                                                                ;          WHICH FOLLOWS W/ 755          <====
020142                          TEST3:
020142  012742  000453                  MOV     #453,-(R2)      ;MOVE TO MAILBOX #  *******  453   *******
020146  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
020150  000000                          HALT                    ;TEST DID NOT SET CC'S CORRECTLY
                                                                ;  OR SEQUENCE ERROR
                                ;***********************************************************************************
                                ;TEST 214       TEST SWAB INSTRUCTION
                                ;***********************************************************************************
020152  005212                  TST214: INC     (R2)            ;UPDATE TEST NUMBER
020154  022712  000214                  CMP     #214,(R2)       ;SEQUENCE ERROR?
020160  001023                          BNE     TST215-10       ;BR TO ERROR HALT ON SEQ ERROR
020162  012700  170000                  MOV     #170000,R0      ;R0=170000
020166  000277                          SCC                     ;CC=0111
020170  000250                          CLN
020172  000300                          SWAB    R0              ;CC=1000   R0=360
020174  101402                          BLOS    SWB1
020176  102401                          BVS     SWB1
020200  100404                          BMI     SWB2
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS  <====
                                                                ;          CONDITIONAL BRANCH INST. AND  <====
                                                                ;          REPLACE THE MOVE INSTRUCTION  <====
                                                                ;          WHICH FOLLOWS W/ 767          <====
020202                          SWB1:
020202  012742  000454                  MOV     #454,-(R2)      ;MOVE TO MAILBOX #  *******  454   *******
020206  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
020210  000000                          HALT                    ;SWAB DID NOT SET CC'S CORRECTLY
020212  000277                  SWB2:   SCC                     ;CC=1011
020214  000244                          CLZ
020216  000300                          SWAB    R0              ;CC=0100   R0=170000
020220  102403                          BVS     SWB3
020222  103402                          BCS     SWB3
020224  100401                          BMI     SWB3
020226  001404                          BEQ     TST215
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS  <====
                                                                ;          CONDITIONAL BRANCH INST. AND  <====
                                                                ;          REPLACE THE MOVE INSTRUCTION  <====
                                                                ;          WHICH FOLLOWS W/ 754          <====
020230                          SWB3:
020230  012742  000455                  MOV     #455,-(R2)      ;MOVE TO MAILBOX #  *******  455   *******
020234  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
020236  000000                          HALT                    ;
```

```

                                    ;*************************************************************************************
                                    ;
                                    ;       THESE NEXT TWO TESTS VERIFY THE FUNCTIONING OF THE ADD AND
                                    ;ADC INSTRUCTIONS.  BOTH OF THESE INSTRUCTIONS HANDLE THE C AND
                                    ;V BITS IDENTICALLY.  THE PROCEDURE IS TO PRESET THE CONDITION
                                    ;CODES, EXECUTE THE INSTRUCTION WITH A PARTICULAR SET OF DATA, AND
                                    ;THEN CHECK THE RESULTS BY EXECUTING A SERIES OF CONDITIONAL
                                    ;BRANCHES.  THES PROCEDURE IS REPEATED SEVERAL TIMES WITH DIFFERENT
                                    ;DATA TO PRODUCE EVERY COMBINATION OF C AND V BITS.
                                    ;
                                    ;*************************************************************************************
                                    ;TEST 215         TEST ADD INSTRUCTION
                                    ;*************************************************************************************
     020240  005212                 TST215: INC      (R2)             ;UPDATE TEST NUMBER
     020242  022712  000215                 CMP      #215,(R2)        ;SEQUENCE ERROR?
     020246  001062                         BNE      TST216-10        ;BR TO ERROR HALT ON SEQ ERROR
     020250  012700  040000                 MOV      #40000,R0        ;R0=40000
     020254  000277                         SCC                       ;CC=1111
     020256  062700  030000                 ADD      #30000,R0        ;CC=0000    R0=70000
     020262  101402                         BLOS     ADD1
     020264  102401                         BVS      ADD1
     020266  100004                         BPL      ADD2
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 767            <====
     020270                         ADD1:
     020270  012742  000456                 MOV      #456,-(R2)       ;MOVE TO MAILBOX #  *******  456  *******
     020274  005242                         INC      -(R2)            ;SET MSGTYP TO FATAL ERROR
     020276  000000                         HALT                      ;ADD DID NOT SET CC'S CORRECTLY
     020300  000264                 ADD2:   SEZ                       ;CC=0100

     020302  062700  010000                 ADD      #10000,R0        ;CC=1010    40=100000
     020306  101402                         BLOS     ADD3
     020310  102001                         BVC      ADD3
     020312  100404                         BMI      ADD4
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 755            <====
     020314                         ADD3:
     020314  012742  000457                 MOV      #457,-(R2)       ;MOVE TO MAILBOX #  *******  457  *******
     020320  005242                         INC      -(R2)            ;SET MSGTYP TO FATAL ERROR
     020322  000000                         HALT                      ;ADD DID NOT SET CC'S CORRECTLY
     020324  000257                 ADD4:   CCC                       ;CC=1000
     020326  000270                         SEN
     020330  062700  100000                 ADD      #100000,R0       ;CC=0111    R0=0
     020334  101002                         BHI      ADD5
     020336  102001                         BVC      ADD5
     020340  100004                         BPL      ADD6
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 742            <====
     020342                         ADD5:
     020342  012742  000460                 MOV      #460,-(R2)       ;MOVE TO MAILBOX #  *******  460  *******
```

```
      020346  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      020350  000000                           HALT                    ;ADD DID NOT SET CC'S CORRECTLY
 3022 020352  062700  177777         ADD6:     ADD     #177777,R0      ;CC=1000    R0=177777
 3023 020356  101402                           BLOS    ADD7
 3024 020360  102401                           BVS     ADD7
 3025 020362  100404                           BMI     ADD8
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 731            <====
      020364                         ADD7:
      020364  012742  000461                   MOV     #461,-(R2)      ;MOVE TO MAILBOX #  *******  461  *******
      020370  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      020372  000000                           HALT                    ;ADD DID NOT SET CC'S CORRECTLY
 3026 020374  000277                 ADD8:     SCC                     ;CC=1010
 3027 020376  000245                           +CLC!CLZ
 3028 020400  062700  000001                   ADD     #1,R0           ;CC=0101    R=0
 3029 020404  102403                           BVS     ADD9
 3030 020406  103002                           BCC     ADD9
 3031 020410  100401                           BMI     ADD9
 3032 020412  001404                           BEQ     TST216
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 715            <====
      020414                         ADD9:
      020414  012742  000462                   MOV     #462,-(R2)      ;MOVE TO MAILBOX #  *******  462  *******
      020420  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      020422  000000                           HALT                    ;ADD DID NOT SET CC'S CORRECTLY
                                                                        ;  OR SEQUENCE ERROR
 3033
 3034                                ;**************************************************************************************
                                     ;TEST 216        TEST ADC INSTRUCTION
                                     ;**************************************************************************************
      020424  005212                 TST216: INC       (R2)            ;UPDATE TEST NUMBER
      020426  022712  000216                   CMP     #216,(R2)       ;SEQUENCE ERROR?
      020432  001037                           BNE     TST217-10       ;BR TO ERROR HALT ON SEQ ERROR
 3035 020434  012700  077777                   MOV     #077777,R0
 3036 020440  000277                           SCC                     ;CC=0101
 3037 020442  000252                           +CLN!CLV
 3038 020444  005500                           ADC     R0              ;CC=1010
 3039 020446  101402                           BLOS    ADC1
 3040 020450  102001                           BVC     ADC1
 3041 020452  100404                           BMI     ADC2
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 767            <====
      020454                         ADC1:
      020454  012742  000463                   MOV     #463,-(R2)      ;MOVE TO MAILBOX #  *******  463  *******
      020460  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      020462  000000                           HALT                    ;ADC DID NOT SET CC'S CORRECTLY
 3042 020464  052700  077777         ADC2:     BIS     #77777,R0
 3043 020470  000277                           SCC                     ;CC=1011
 3044 020472  000244                           CLZ
 3045 020474  005500                           ADC     R0              ;CC=0101    R0=0
 3046 020476  101002                           BHI     ADC3
```

```
3047 020500  102401                     BVS     ADC3
3048 020502  100004                     BPL     ADC4
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 753            <====
     020504                     ADC3:
     020504  012742  000464             MOV     #464,-(R2)      ;MOVE TO MAILBOX #  *******  464  *******
     020510  005242                     INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     020512  000000                     HALT                    ;ADC DID NOT SET CC'S CORRECTLY
3049 020514  000277             ADC4:   SCC
3050 020516  000245                     +CLZ!CLC                          ;CC=1010
3051 020520  005500                     ADC     R0              ;CC=0100
3052 020522  102403                     BVS     ADC5
3053 020524  103402                     BCS     ADC5
3054 020526  100401                     BMI     ADC5
3055 020530  001404                     BEQ     TST217
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 740            <====
     020532                     ADC5:
     020532  012742  000465             MOV     #465,-(R2)      ;MOVE TO MAILBOX #  *******  465  *******
     020536  005242                     INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     020540  000000                     HALT                    ;ADC DID NOT SET CC'S CORRECTLY
                                                                ;  OR SEQUENCE ERROR
3056
3057                            ;*********************************************************************************
3058                            ;
3059                            ;       THESE NEXT THREE TESTS VERIFY THE FUNCTIONING OF THE NEG,
3060                            ;CMP, AND COM INSTRUCTIONS.  EACH OF THESE INSTRUCTIONS GENERATE
3061                            ;THE C AND V BITS IDENTICALLY.  THE CONDITION CODES ARE PRESET,
3062                            ;THE INSTRUCTIONS EXECUTED, AND THE RESULTS CHECKED WITH A SERIES
3063                            ;OF CONDITIONAL BRANCH INSTRUCTIONS.  THIS PROCEDURE IS REPEATED
3064                            ;SEVERAL TIMES WITH DIFFERENT DATA IN ORDER TO GENERATE DIFFERENT
3065                            ;COMBINATIONS OF THE C AND V BITS.
3066                            ;
3067                            ;*********************************************************************************
                                ;TEST 217       TEST NEG INSTRUCTION
                                ;*********************************************************************************
     020542  005212             TST217: INC     (R2)            ;UPDATE TEST NUMBER
     020544  022712  000217             CMP     #217,(R2)       ;SEQUENCE ERROR?
     020550  001042                     BNE     TST220-10       ;BR TO ERROR HALT ON SEQ ERROR
3068 020552  012700  000001             MOV     #1,R0
3069 020556  000277                     SCC                     ;CC=0110
3070 020560  000251                     +CLN!CLC
3071 020562  005400                     NEG     R0              ;CC=1001   R0=177777
3072 020564  103003                     BCC     NEG1
3073 020566  102402                     BVS     NEG1
3074 020570  001401                     BEQ     NEG1
3075 020572  100404                     BMI     NEG2
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 766            <====
     020574                     NEG1:
     020574  012742  000466             MOV     #466,-(R2)      ;MOVE TO MAILBOX #  *******  466  *******
     020600  005242                        INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     020602  000000                        HALT                        ;NEG DID NOT SET CC'S CORRECTLY
     020604  042700  077777        NEG2:   BIC     #77777,R0
     020610  000257                        CCC                         ;CC=0100
     020612  000264                        SEZ
     020614  005400                        NEG     R0                  ;CC=1011    R0=100000
     020616  102003                        BVC     NEG3
     020620  103002                        BCC     NEG3
     020622  001401                        BEQ     NEG3
     020624  100404                        BMI     NEG4
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 751            <====
     020626                        NEG3:
     020626  012742  000467                MOV     #467,-(R2)          ;MOVE TO MAILBOX #  *******  467  *******
     020632  005242                        INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     020634  000000                        HALT                        ;NEG DID NOT SET CC'S CORRECTLY
     020636  005000                NEG4:   CLR     R0
     020640  000277                        SCC                         ;CC=1011
     020642  000244                        CLZ
     020644  005400                        NEG     R0                  ;CC=0100    R0=0
     020646  102403                        BVS     NEG5
     020650  103402                        BCS     NEG5
     020652  001001                        BNE     NEG5
     020654  100004                        BPL     TST220
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 735            <====
     020656                        NEG5:
     020656  012742  000470                MOV     #470,-(R2)          ;MOVE TO MAILBOX #  *******  470  *******
     020662  005242                        INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     020664  000000                        HALT                        ;NEG DID NOT SET CC'S CORRECTLY
                                                                       ;  OR SEQUENCE ERROR

                                   ;*****************************************************************************
                                   ;TEST 220       TEST CMP INSTRUCTION
                                   ;*****************************************************************************
     020666  005212                TST220: INC     (R2)                ;UPDATE TEST NUMBER
     020670  022712  000220                CMP     #220,(R2)           ;SEQUENCE ERROR?
     020674  001060                        BNE     TST221-10           ;BR TO ERROR HALT ON SEQ ERROR
     020676  012700  000005                MOV     #5,R0
     020702  000257                        CCC                         ;CC=1010
     020704  000271                        +SEN!SEC
     020706  022700  000005                CMP     #5,R0               ;CC=0101
     020712  101002                        BHI     CMP1
     020714  102401                        BVS     CMP1
     020716  100004                        BPL     CMP2
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 766            <====
     020720                        CMP1:
     020720  012742  000471                MOV     #471,-(R2)          ;MOVE TO MAILBOX #  *******  471  *******
     020724  005242                        INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     020726  000000                        HALT                        ;CMP DID NOT SET CC'S CORRECTLY
     020730  012700  100000          CMP2:   MOV     #100000,R0
     020734  000277                          SCC                         ;CC=1101
     020736  000242                          CLV
     020740  020027  077777                  CMP     R0,#77777           ;CC=0010
     020744  101402                          BLOS    CMP3
     020746  102001                          BVC     CMP3
     020750  100004                          BPL     CMP4
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                         ;           CONDITIONAL BRANCH INST. AND     <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                         ;           WHICH FOLLOWS W/ 751             <====
     020752                          CMP3:
     020752  012742  000472                  MOV     #472,-(R2)          ;MOVE TO MAILBOX #  *******  472  *******
     020756  005242                          INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     020760  000000                          HALT                        ;CMP DID NOT SET CC'S CORRECTLY
     020762  052700  040000          CMP4:   BIS     #40000,R0           ;R0=140000
     020766  000257                          CCC                         ;CC=0100
     020770  000264                          SEZ
     020772  022700  040000                  CMP     #40000,R0           ;CC=1011
     020776  102003                          BVC     CMP5
     021000  103002                          BCC     CMP5
     021002  001401                          BEQ     CMP5
     021004  100404                          BMI     CMP6
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                         ;           CONDITIONAL BRANCH INST. AND     <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                         ;           WHICH FOLLOWS W/ 733             <====
     021006                          CMP5:
     021006  012742  000473                  MOV     #473,-(R2)          ;MOVE TO MAILBOX #  *******  473  *******
     021012  005242                          INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     021014  000000                          HALT                        ;CMP DID NOT SET CC'S CORRECTLY
     021016  042700  040000          CMP6:   BIC     #40000,R0
     021022  000277                          SCC                         ;CC=1111
     021024  022700  177777                  CMP     #-1,R0              ;CC=0000
     021030  101402                          BLOS    CMP7
     021032  102401                          BVS     CMP7
     021034  100004                          BPL     TST221
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                         ;           CONDITIONAL BRANCH INST. AND     <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                         ;           WHICH FOLLOWS W/ 717             <====
     021036                          CMP7:
     021036  012742  000474                  MOV     #474,-(R2)          ;MOVE TO MAILBOX #  *******  474  *******
     021042  005242                          INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     021044  000000                          HALT                        ;CMP DID NOT SET CC'S CORRECTLY
                                                                         ;  OR SEQUENCE ERROR


                                     ;*************************************************************************************
                                     ;TEST 221          TEST COM INSTRUCTION
                                     ;*************************************************************************************
     021046  005212                  TST221: INC     (R2)                ;UPDATE TEST NUMBER
     021050  022712  000221                  CMP     #221,(R2)           ;SEQUENCE ERROR?
     021054  001010                          BNE     TST222-10           ;BR TO ERROR HALT ON SEQ ERROR
     021056  012700  177777                  MOV     #-1,R0
     021062  000257                          CCC                         ;CC=1010
     021064  000265                          +SEC!SEZ
     021066  005100                          COM     R0                  ;CC=0101
```

```
021070  101002                          BHI     COM1
021072  102401                          BVS     COM1
021074  100004                          BPL     TST222
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 767             <====
021076                          COM1:
021076  012742  000475                  MOV     #475,-(R2)      ;MOVE TO MAILBOX #  *******  475  *******
021102  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
021104  000000                          HALT                    ;COM DID NOT SET CC'S CORRECTLY
                                                                ;  OR SEQUENCE ERROR


                                ;*******************************************************************************
                                ;
                                ;       THESE NEXT TWO TESTS VERIFY THE FUNCTIONING OF THE SUB
                                ;AND SBC INSTRUCTIONS.  BOTH OF THESE INSTRUCTIONS HANDLE THE
                                ;C AND V BITS IDENTICALLY.  THE PROCEDURE IS TO PRESET THE CONDITION
                                ;CODES, EXECUTE THE INSTRUCTION WITH A PARTICULAR SET OF DATA, AND
                                ;THEN CHECK THE RESULTS BY EXECUTING A SERIES OF CONDITIONAL
                                ;BRANCHES.  THIS PROCEDURE IS REPEATED SEVERAL TIMES WITH DIFFERENT
                                ;DATA PATTERNS TO PROVIDE EVERY COMBINATION OF THE C AND V BITS.
                                ;
                                ;*******************************************************************************
                                ;TEST 222       TEST SUB INSTRUCTION
                                ;*******************************************************************************
021106  005212                  TST222: INC     (R2)            ;UPDATE TEST NUMBER
021110  022712  000222                  CMP     #222,(R2)       ;SEQUENCE ERROR?
021114  001055                          BNE     TST223-10       ;BR TO ERROR HALT ON SEQ ERROR
021116  012700  125252                  MOV     #125252,R0
021122  000257                          CCC                     ;CC=1010
021124  000271                          +SEN!SEC
021126  162700  125252                  SUB     #125252,R0      ;CC=0101   R0=0
021132  101002                          BHI     SUB1
021134  102401                          BVS     SUB1
021136  100004                          BPL     SUB2
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 766             <====
021140                          SUB1:
021140  012742  000476                  MOV     #476,-(R2)      ;MOVE TO MAILBOX #  *******  476  *******
021144  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
021146  000000                          HALT                    ;SUB DID NOT SET CC'S CORRECTLY
021150  052700  100000          SUB2:   BIS     #100000,R0
021154  000277                          SCC                     ;CC=1101
021156  000242                          CLV
021160  162700  077777                  SUB     #77777,R0       ;CC=0010   R0=1
021164  101402                          BLOS    SUB3
021166  102001                          BVC     SUB3
021170  100004                          BPL     SUB4
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 751             <====
021172                          SUB3:
      021172  012742  000477                 MOV     #477,-(R2)        ;MOVE TO MAILBOX #  *******  477  *******
      021176  005242                         INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
      021200  000000                         HALT                      ;
      021202  005100                 SUB4:   COM     R0                ;R0=177777
      021204  000277                         SCC                       ;CC=11111

      021206  162700  100000                 SUB     #100000,R0        ;CC=0000   R0=77777
      021212  101402                         BLOS    SUB5
      021214  102401                         BVS     SUB5
      021216  100004                         BPL     SUB6
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 736            <====
      021220                         SUB5:
      021220  012742  000500                 MOV     #500,-(R2)        ;MOVE TO MAILBOX #  *******  500  *******
      021224  005242                         INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
      021226  000000                         HALT                      ;SUB DID NOT SET CC'S CORRECTLY
      021230  000257                 SUB6:   CCC                       ;CC=0100
      021232  000264                         SEZ
      021234  162700  140000                 SUB     #140000,R0        ;CC=1011
      021240  102003                         BVC     SUB7
      021242  103002                         BCC     SUB7
      021244  001401                         BEQ     SUB7
      021246  100404                         BMI     TST223
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 722            <====
      021250                         SUB7:
      021250  012742  000501                 MOV     #501,-(R2)        ;MOVE TO MAILBOX #  *******  501  *******
      021254  005242                         INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
      021256  000000                         HALT                      ;


                                     ;*******************************************************************************
                                     ;TEST 223         TEST SBC INSTRUCTION
                                     ;*******************************************************************************
      021260  005212                 TST223: INC     (R2)              ;UPDATE TEST NUMBER
      021262  022712  000223                 CMP     #223,(R2)         ;SEQUENCE ERROR?
      021266  001053                         BNE     TST224-10         ;BR TO ERROR HALT ON SEQ ERROR
      021270  012700  000001                 MOV     #1,R0
      021274  000277                         SCC                       ;CC=1011
      021276  000244                         CLZ
      021300  005600                         SBC     R0                ;CC=0100   R=0
      021302  103403                         BCS     SBC1
      021304  102402                         BVS     SBC1
      021306  100401                         BMI     SBC1
      021310  001404                         BEQ     SBC2
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 766            <====
      021312                         SBC1:
      021312  012742  000502                 MOV     #502,-(R2)        ;MOVE TO MAILBOX #  *******  502  *******
      021316  005242                         INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
      021320  000000                         HALT                      ;SBC DID NOT SET CC'S CORRECTLY
      021322  000277                 SBC2:   SCC                       ;CC=1010
```

```
  3183 021324  000245                         +CLZ!CLC
  3184 021326  005600                         SBC     R0              ;CC=0100   R=0
  3185 021330  103403                         BCS     SBC3
  3186 021332  102402                         BVS     SBC3
  3187 021334  100401                         BMI     SBC3
  3188 021336  001404                         BEQ     SBC4
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                      ;           CONDITIONAL BRANCH INST. AND     <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                      ;           WHICH FOLLOWS W/ 753             <====
       021340                         SBC3:
       021340  012742  000503                 MOV     #503,-(R2)      ;MOVE TO MAILBOX #  *******  503  *******
       021344  005242                         INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       021346  000000                         HALT                    ;SBC DID NOT SET CC'S CORRECTLY
  3189 021350  000277                 SBC4:   SCC                     ;CC=0111
  3190 021352  000250                         CLN
  3191 021354  005600                         SBC     R0              ;CC=1001   R0=177777
  3192 021356  103003                         BCC     SBC5
  3193 021360  102402                         BVS     SBC5
  3194 021362  001401                         BEQ     SBC5
  3195 021364  100404                         BMI     SBC6
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                      ;           CONDITIONAL BRANCH INST. AND     <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                      ;           WHICH FOLLOWS W/ 740             <====
       021366                         SBC5:
       021366  012742  000504                 MOV     #504,-(R2)      ;MOVE TO MAILBOX #  *******  504  *******
       021372  005242                         INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       021374  000000                         HALT                    ;SBC DID NOT SET CC'S CORRECTLY
  3196 021376  042700  077777         SBC6:   BIC     #77777,R0       ;R0=100000
  3197 021402  000277                         SCC                     ;CC=1101
  3198 021404  000242                         CLV
  3199 021406  005600                         SBC     R0              ;CC=0010
  3200 021410  101402                         BLOS    SBC7
  3201 021412  102001                         BVC     SBC7
  3202 021414  100004                         BPL     TST224
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                      ;           CONDITIONAL BRANCH INST. AND     <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                      ;           WHICH FOLLOWS W/ 724             <====
       021416                         SBC7:
       021416  012742  000505                 MOV     #505,-(R2)      ;MOVE TO MAILBOX #  *******  505  *******
       021422  005242                         INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       021424  000000                         HALT                    ;SBC DID NOT SET CC'S CORRECTLY
                                                                      ;  OR SEQUENCE ERROR
  3203
  3204                                ;*************************************************************************************
  3205                                ;
  3206                                ;       THESE NEXT FOUR TESTS VERIFY THE FUNCTIONING OF THE ROL,
  3207                                ;ROR, ASL AND ASR INSTRUCTIONS.  SPECIAL DATA PATTERNS ARE LOADED
  3208                                ;AND ROTATED SEVERAL TIMES FOR EACH TEST.  THE CONDITION CODES
  3209                                ;ARE PRESET BEFORE EACH ROTATION AND THE CONDITION CODES ARE
  3210                                ;CHECKED AFTER EACH ROTATION.  THE FINAL CHECK IN EACH TEST IS
  3211                                ;TO VERIFY THE COMMULATIVE DATA RESULT.  THE DATA PATTERNS HAVE
  3212                                ;BEEN SELECTED TO PRODUCE ALL COMBINATIONS OF THE C AND V BITS.
  3213                                ;
  3214                                ;*************************************************************************************
```

```
                                         ;TEST 224        TEST ROL INSTRUCTION
                                         ;*************************************************************************
     021426  005212                      TST224: INC     (R2)                    ;UPDATE TEST NUMBER
     021430  022712  000224                      CMP     #224,(R2)               ;SEQUENCE ERROR?
     021434  001053                              BNE     TST225-10               ;BR TO ERROR HALT ON SEQ ERROR
3215 021436  012700  144000                      MOV     #144000,R0              ;R0=144000
3216 021442  000257                              CCC                             ;CC=0110
3217 021444  000266                              +SEZ!SEV
3218 021446  006100                              ROL     R0                      ;CC=1001   R0=110000
3219 021450  103003                              BCC     ROL1
3220 021452  102402                              BVS     ROL1
3221 021454  001401                              BEQ     ROL1
3222 021456  100404                              BMI     ROL2

                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                         ;           CONDITIONAL BRANCH INST. AND    <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                         ;           WHICH FOLLOWS W/ 766            <====
     021460                              ROL1:
     021460  012742  000506                      MOV     #506,-(R2)              ;MOVE TO MAILBOX #  *******  506  *******
     021464  005242                              INC     -(R2)                   ;SET MSGTYP 10 FATAL ERROR
     021466  000000                              HALT                            ;
3223 021470  000277                      ROL2:   SCC                             ;CC=1100
3224 021472  000243                              +CLV!CLC
3225 021474  006100                              ROL     R0                      ;CC=0011   R0=020000
3226 021476  103003                              BCC     ROL3
3227 021500  102002                              BVC     ROL3
3228 021502  001401                              BEQ     ROL3
3229 021504  100004                              BPL     ROL4

                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                         ;           CONDITIONAL BRANCH INST. AND    <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                         ;           WHICH FOLLOWS W/ 753            <====
     021506                              ROL3:
     021506  012742  000507                      MOV     #507,-(R2)              ;MOVE TO MAILBOX #  *******  507  *******
     021512  005242                              INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
     021514  000000                              HALT                            ;ROL DID NOT SET CC'S CORRECTLY
3230 021516  000277                      ROL4:   SCC                             ;CC=0111
3231 021520  000250                              CLN
3232 021522  006100                              ROL     R0                      ;CC=0000   R0=040001
3233 021524  101402                              BLOS    ROL5
3234 021526  102401                              BVS     ROL5
3235 021530  100004                              BPL     ROL6

                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                         ;           CONDITIONAL BRANCH INST. AND    <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                         ;           WHICH FOLLOWS W/ 741            <====
     021532                              ROL5:
     021532  012742  000510                      MOV     #510,-(R2)              ;MOVE TO MAILBOX #  *******  510  *******
     021536  005242                              INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
     021540  000000                              HALT                            ;ROL DID NOT SET CC'S CORRECTLY
3236 021542  000257                      ROL6:   CCC                             ;CC=0101
3237 021544  000265                              +SEZ!SEC
3238 021546  006100                              ROL     R0                      ;CC=1010   R0=100003
3239 021550  101405                              BLOS    ROL7
3240 021552  102004                              BVC     ROL7
3241 021554  100003                              BPL     ROL7
3242 021556  022700  100003                      CMP     #100003,R0
```

```
   3243 021562  001404                       BEQ     TST225
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                      ;           CONDITIONAL BRANCH INST. AND      <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                      ;           WHICH FOLLOWS W/ 724              <====
        021564                         ROL7:
        021564  012742  000511               MOV     #511,-(R2)       ;MOVE TO MAILBOX #  *******  511  *******
        021570  005242                       INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
        021572  000000                       HALT                     ;ROL MALFUNCTIONED
                                                                      ;  OR SEQUENCE ERROR
   3244                                ;*****************************************************************************
                                       ;TEST 225        TEST ROR INSTRUCTION
                                       ;*****************************************************************************
        021574  005212                 TST225: INC   (R2)             ;UPDATE TEST NUMBER
        021576  022712  000225               CMP     #225,(R2)        ;SEQUENCE ERROR?
        021602  001051                       BNE     TST226-10        ;BR TO ERROR HALT ON SEQ ERROR
   3245 021604  012700  000023               MOV     #23,R0           ;R0=23
   3246 021610  000277                       SCC                      ;CC=0111
   3247 021612  000250                       CLN
   3248 021614  006000                       ROR     R0               ;CC=1001    R0=100011
   3249 021616  102403                       BVS     ROR1
   3250 021620  103002                       BCC     ROR1
   3251 021622  001401                       BEQ     ROR1
   3252 021624  100404                       BMI     ROR2
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                      ;           CONDITIONAL BRANCH INST. AND      <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                      ;           WHICH FOLLOWS W/ 766              <====
        021626                         ROR1:
        021626  012742  000512               MOV     #512,-(R2)       ;MOVE TO MAILBOX #  *******  512  *******
        021632  005242                       INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
        021634  000000                       HALT                     ;ROR DID NOT SET CC'S CORRECTLY
   3253 021636  000257                 ROR2: CCC                      ;CC=1100
   3254 021640  000274                       +SEN!SEZ
   3255 021642  006000                       ROR     R0               ;CC=0011    R0=040004
   3256 021644  102003                       BVC     ROR3
   3257 021646  103002                       BCC     ROR3
   3258 021650  001401                       BEQ     ROR3
   3259 021652  100004                       BPL     ROR4
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                      ;           CONDITIONAL BRANCH INST. AND      <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                      ;           WHICH FOLLOWS W/ 753              <====
        021654                         ROR3:
        021654  012742  000513               MOV     #513,-(R2)       ;MOVE TO MAILBOX #  *******  513  *******
        021660  005242                       INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
        021662  000000                       HALT                     ;ROR DID NOT SET CC'S CORRECTLY
   3260 021664  000277                 ROR4: SCC                      ;CC=1110
   3261 021666  000241                       CLC
   3262 021670  006000                       ROR     R0               ;CC=0000    R0=020002
   3263 021672  101403                       BLOS    ROR5
   3264 021674  102402                       BVS     ROR5
   3265 021676  001401                       BEQ     ROR5
   3266 021700  100004                       BPL     ROR6
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                      ;           CONDITIONAL BRANCH INST. AND      <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION      <====
                                                            ;               WHICH FOLLOWS W/ 740          <====
     021702                          ROR5:
     021702  012742  000514                  MOV     #514,-(R2)     ;MOVE TO MAILBOX #  *******  514  *******
     021706  005242                          INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     021710  000000                          HALT                   ;ROR DID NOT SET CC'S CORRECTLY
3267 021712  000257                  ROR6:   CCC                    ;CC=0101
3268 021714  000265                          +SEC!SEZ
3269 021716  006000                          ROR     R0             ;CC=1010   R0=110001
3270 021720  101402                          BLOS    ROR7
3271 021722  102001                          BVC     ROR7
3272 021724  100404                          BMI     TST226
                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                            ;           CONDITIONAL BRANCH INST. AND      <====
                                                            ;           REPLACE THE MOVE INSTRUCTION      <====
                                                            ;           WHICH FOLLOWS W/ 726              <====
     021726                          ROR7:
     021726  012742  000515                  MOV     #515,-(R2)     ;MOVE TO MAILBOX #  *******  515  *******
     021732  005242                          INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     021734  000000                          HALT                   ;ROR DID NOT PRODUCE CORRECT RESULTS
                                                                    ;  OR SEQUENCE ERROR
3273                                 ;*****************************************************************************
                                     ;TEST 226       TEST ASL INSTRUCTION
                                     ;*****************************************************************************
     021736  005212                  TST226: INC     (R2)           ;UPDATE TEST NUMBER
     021740  022712  000226                  CMP     #226,(R2)      ;SEQUENCE ERROR?
     021744  001054                          BNE     TST227-10      ;BR TO ERROR HALT ON SEQ ERROR
3274 021746  012700  144000                  MOV     #144000,R0     ;R0=14000
3275 021752  000257                          CCC                    ;CC=0110
3276 021754  000271                          +SEN!SEC
3277 021756  006300                          ASL     R0             ;CC=1001   R0=110000
3278 021760  103003                          BCC     ASL1
3279 021762  102402                          BVS     ASL1
3280 021764  001401                          BEQ     ASL1
3281 021766  100404                          BMI     ASL2
                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                            ;           CONDITIONAL BRANCH INST. AND      <====
                                                            ;           REPLACE THE MOVE INSTRUCTION      <====
                                                            ;           WHICH FOLLOWS W/ 766              <====
     021770                          ASL1:
     021770  012742  000516                  MOV     #516,-(R2)     ;MOVE TO MAILBOX #  *******  516  *******
     021774  005242                          INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     021776  000000                          HALT                   ;
3282 022000  000277                  ASL2:   SCC                    ;CC=1100
3283 022002  000243                          +CLV!CLC
3284 022004  006300                          ASL     R0             ;CC=0011   R0=020000
3285 022006  103003                          BCC     ASL3
3286 022010  102002                          BVC     ASL3
3287 022012  001401                          BEQ     ASL3
3288 022014  100004                          BPL     ASL4
                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                            ;           CONDITIONAL BRANCH INST. AND      <====
                                                            ;           REPLACE THE MOVE INSTRUCTION      <====
                                                            ;           WHICH FOLLOWS W/ 753              <====
     022016                          ASL3:
     022016  012742  000517                  MOV     #517,-(R2)     ;MOVE TO MAILBOX #  *******  517  *******
     022022  005242                          INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     022024  000000                          HALT                   ;ASL DID NOT SET CC'S CORRECTLY
```

```
022026  000277                  ASL4:   SCC                     ;CC=0111
022030  000250                          CLN
022032  006300                          ASL     R0              ;CC=0000    R0=040000
022034  101402                          BLOS    ASL5
022036  102401                          BVS     ASL5
022040  100004                          BPL     ASL6
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 741            <====
022042                          ASL5:
022042  012742  000520                  MOV     #520,-(R2)      ;MOVE TO MAILBOX #  *******  520  *******
022046  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
022050  000000                          HALT                    ;ASL DID NOT SET CC'S CORRECTLY
022052  000257                  ASL6:   CCC                     ;CC=0101
022054  000265                          +SEZ!SEC
022056  006300                          ASL     R0              ;CC=1010    R0=100000
022060  103406                          BCS     ASL7
022062  001405                          BEQ     ASL7
022064  102004                          BVC     ASL7
022066  100003                          BPL     ASL7
022070  022700  100000                  CMP     #100000,R0
022074  001404                          BEQ     TST227
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 723            <====
022076                          ASL7:
022076  012742  000521                  MOV     #521,-(R2)      ;MOVE TO MAILBOX #  *******  521  *******
022102  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
022104  000000                          HALT                    ;ASL MALFUNCTIONED
                                                                ;  OR SEQUENCE ERROR
                                ;***********************************************************************
                                ;TEST 227       TEST ASR INSTRUCTION
                                ;***********************************************************************
022106  005212                  TST227: INC     (R2)            ;UPDATE TEST NUMBER
022110  022712  000227                  CMP     #227,(R2)       ;SEQUENCE ERROR?
022114  001060                          BNE     TST230-10       ;BR TO ERROR HALT ON SEQ ERROR
022116  012700  100023                  MOV     #100023,R0      ;R0=100023
022122  000277                          SCC                     ;CC=0110
022124  000250                          CLN
022126  006200                          ASR     R0              ;CC=1001    RP=140011
022130  102403                          BVS     ASR1
022132  103002                          BCC     ASR1
022134  001401                          BEQ     ASR1
022136  100404                          BMI     ASR2
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 766            <====
022140                          ASR1:
022140  012742  000522                  MOV     #522,-(R2)      ;MOVE TO MAILBOX #  *******  522  *******
022144  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
022146  000000                          HALT                    ;ASR DID NOT SET CC'S CORRECTLY
022150  042700  100000          ASR2:   BIC     #100000,R0      ;R0=40011
022154  000277                          SCC                     ;CC=1100
022156  000243                          +CLV!CLC
```

```
   3316 022160  006200                          ASR     R0              ;CC=0011    R0=020004
   3317 022162  102003                          BVC     ASR3
   3318 022164  103002                          BCC     ASR3
   3319 022166  001401                          BEQ     ASR3
   3320 022170  100004                          BPL     ASR4
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 751            <====
        022172                          ASR3:
        022172  012742  000523                  MOV     #523,-(R2)      ;MOVE TO MAILBOX #  *******  523  *******
        022176  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        022200  000000                          HALT                    ;ASR DID NOT SET CC'S CORRECTLY
   3321 022202  000277                  ASR4:   SCC                     ;CC=1111
   3322
   3323 022204  006200                          ASR     R0              ;CC=0000    R0=010002
   3324 022206  101403                          BLOS    ASR5
   3325 022210  102402                          BVS     ASR5
   3326 022212  001401                          BEQ     ASR5
   3327 022214  100004                          BPL     ASR6
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 737            <====
        022216                          ASR5:
        022216  012742  000524                  MOV     #524,-(R2)      ;MOVE TO MAILBOX #  *******  524  *******
        022222  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        022224  000000                          HALT                    ;ASR DID NOT SET CC'S CORRECTLY
   3328 022226  052700  100000          ASR6:   BIS     #100000,R0      ;R0=110002
   3329 022232  000257                          CCC                     ;CC=0101
   3330 022234  000265                          +SEZ!SEC
   3331 022236  006200                          ASR     R0              ;C=1010    R0=144001
   3332 022240  101406                          BLOS    ASR7
   3333 022242  102005                          BVC     ASR7
   3334 022244  100004                          BPL     ASR7
   3335 022246  001403                          BEQ     ASR7
   3336 022250  022700  144001                  CMP     #144001,R0      ;CHECK RESULT OF ASR'S
   3337 022254  001404                          BEQ     TST230
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 717            <====
        022256                          ASR7:
        022256  012742  000525                  MOV     #525,-(R2)      ;MOVE TO MAILBOX #  *******  525  *******
        022262  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        022264  000000                          HALT                    ;ASR DID NOT FUNCTION CORRECTLY
                                                                        ;  OR SEQUENCE ERROR
   3344
   3345
   3346
   3347                                 ;*******************************************************************************
   3348                                 ;
   3349                                 ;               THIS TEST VERIFIES THE SXT INSTRUCTION. CONDITION CODES
   3350                                 ;ARE PRESET IN EACH OF THE TWO POSSIBLE CASES. WITH THE N-BIT SET,
   3351                                 ;THE TEST CHECKS FOR ALL ONES IN THE DESTINATION. WITH THE N-BIT
   3352                                 ;CLEAR, THE DESTINATION SHOULD CONTAIN ALL ZEROES. THE DATA
   3353                                 ;IS VERIFIED BY CONDITIONAL BRANCHES.
```

```
                                 ;
                                 ;*************************************************************************
                                 ;TEST 230        TEST THE SXT INSTRUCTION
                                 ;*************************************************************************
 022266  005212                  TST230: INC     (R2)            ;UPDATE TEST NUMBER
 022270  022712  000230                  CMP     #230,(R2)       ;SEQUENCE ERROR?
 022274  001033                          BNE     TST231-10       ;BR TO ERROR HALT ON SEQ ERROR
 022276  005000                          CLR     R0
 022300  000277                          SCC                     ;SET CC=1011
 022302  000244                          CLZ
 022304  006700                          SXT     R0              ;TRY SXT
 022306  100006                          BPL     SXT0            ;TEST CC=1001
 022310  001405                          BEQ     SXT0
 022312  102404                          BVS     SXT0
 022314  103003                          BCC     SXT0
 022316  022700  177777                  CMP     #-1,R0          ;CHECK DATA RESULT
 022322  001404                          BEQ     SXT1
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                 ;           CONDITIONAL BRANCH INST. AND     <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                 ;           WHICH FOLLOWS W/ 764             <====
 022324                          SXT0:
 022324  012742  000526                  MOV     #526,-(R2)      ;MOVE TO MAILBOX #  *******  526  *******
 022330  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
 022332  000000                          HALT                    ;RESULTS OF SXT INCORRECT
 022334  005000                  SXT1:   CLR     R0              ;R0=0
 022336  005010                          CLR     (R0)            ;LOC. 0=0
 022340  005110                          COM     (R0)            ;LOC. 0=177777
 022342  000257                          CCC                     ;SET CC=0110
 022344  000266                          +SEZ!SEV
 022346  006710                          SXT     (R0)
 022350  001005                          BNE     SXT2            ;TEST CC=0100
 022352  103404                          BCS     SXT2
 022354  102403                          BVS     SXT2
 022356  100402                          BMI     SXT2
 022360  005710                          TST     (R0)
 022362  001404                          BEQ     TST231
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                 ;           CONDITIONAL BRANCH INST. AND     <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                 ;           WHICH FOLLOWS W/ 744             <====
 022364                          SXT2:
 022364  012742  000527                  MOV     #527,-(R2)      ;MOVE TO MAILBOX #  *******  527  *******
 022370  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
 022372  000000                          HALT                    ;RESULTS OF SXT INCORRECT
                                                                 ;  OR SEQUENCE ERROR
                                 ;*************************************************************************
                                 ;
                                 ;               THIS TEST VERIFIES THE XOR INSTRUCTION. UNIQUE PATTERNS
                                 ;OF ONES AND ZEROES ARE MOVED TO DATA REGISTERS R0 AND R1.
                                 ;AFTER THE FIRST XOR INSTRUCTION R0=36146. AN XOR IS THEN
                                 ;EXECUTED WITH THIS NEW VALUE AND THE CONTENTS OF R1 TO
                                 ;REPRODUCE THE ORIGINAL VALUE IF R0=31525.
                                 ;
                                 ;*************************************************************************
                                 ;TEST 231        TEST THE XOR INSTRUCTION
                                 ;*************************************************************************
```

```
     022374  005212                  TST231: INC     (R2)            ;UPDATE TEST NUMBER
     022376  022712  000231                  CMP     #231,(R2)       ;SEQUENCE ERROR?
     022402  001035                          BNE     TST232-10       ;BR TO ERROR HALT ON SEQ ERROR
     022404  012700  007463                  MOV     #7463,R0        ;SET UP R0
     022410  012701  031525                  MOV     #31525,R1       ;SET UP R1
     022414  000277                          SCC                     ;SET CC=1110
     022416  000241                          CLC
     022420  074100                          XOR     R1,R0           ;TRY XOR
     022422  101406                          BLOS    XOR1            ;CC=0000?
     022424  102405                          BVS     XOR1
     022426  001404                          BEQ     XOR1
     022430  100403                          BMI     XOR1
     022432  022700  036146                  CMP     #36146,R0       ;DATA RESULT CORRECT?
     022436  001404                          BEQ     XOR2
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                     ;           CONDITIONAL BRANCH INST. AND      <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                     ;           WHICH FOLLOWS W/ 761              <====
     022440                          XOR1:
     022440  012742  000530                  MOV     #530,-(R2)      ;MOVE TO MAILBOX #  *******  530  *******
     022444  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     022446  000000                          HALT                    ;
     022450  010104                  XOR2:   MOV     R1,R4
     022452  000261                          SEC                     ;CC=1110
     022454  000241                          CLC
     022456  074400                          XOR     R4,R0           ;TRY XOR MODE 0,0
     022460  101406                          BLOS    XOR3            ;CC=0000?
     022462  102405                          BVS     XOR3
     022464  001404                          BEQ     XOR3
     022466  100403                          BMI     XOR3
     022470  022700  007463                  CMP     #7463,R0
     022474  001404                          BEQ     TST232
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                     ;           CONDITIONAL BRANCH INST. AND      <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                     ;           WHICH FOLLOWS W/ 742              <====
     022476                          XOR3:
     022476  012742  000531                  MOV     #531,-(R2)      ;MOVE TO MAILBOX #  *******  531  *******
     022502  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     022504  000000                          HALT                    ;RESULT OF XOR INCORRECT
                                                                     ;  OR SEQUENCE ERROR
                                     ;*************************************************************************
                                     ;
                                     ;          THIS TEST VERIFIES THE SOB INSTRUCTION. R4 IS USED AS A
                                     ;COUNTER WHILE R0 IS THE ADDRESS REGISTER. CONDITIONAL
                                     ;BRANCHES ARE USED TO VERIFY PROPER TRANSFER OF CONTROL
                                     ;WHILE R4 IS CHECKED TO INSURE PROPER DECREMENTING OF R0.
                                     ;
                                     ;*************************************************************************
                                     ;TEST 232          TEST SOB INSTRUCTION
                                     ;*************************************************************************
     022506  005212                  TST232: INC     (R2)            ;UPDATE TEST NUMBER
     022510  022712  000232                  CMP     #232,(R2)       ;SEQUENCE ERROR?
     022514  001023                          BNE     TST233-10       ;BR TO ERROR HALT ON SEQ ERROR
     022516  012700  000525                  MOV     #525,R0
     022522  010004                          MOV     R0,R4
     022524  000277                          SCC                     ;SET CC=1111
     022526  101002                  SOB1:   BHI     SOB2                    ;CC=1111?
     022530  100001                          BPL     SOB2
     022532  102404                          BVS     SOB3
                                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                             ;           CONDITIONAL BRANCH INST. AND     <====
                                                                             ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                             ;           WHICH FOLLOWS W/ 770             <====
     022534                          SOB2:
     022534  012742  000532                  MOV     #532,-(R2)              ;MOVE TO MAILBOX #  *******  532  *******
     022540  005242                          INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
     022542  000000                          HALT                            ;
     022544  005304                  SOB3:   DEC     R4                      ;COUNT ITERATIONS
     022546  000277                          SCC                             ;CC=1111
     022550  077012                          SOB     R0,SOB1                 ;DO SOB W/ R0
     022552  101004                          BHI     SOB4                    ;CHECK CC=1111
     022554  100003                          BPL     SOB4
     022556  102002                          BVC     SOB4
     022560  005704                          TST     R4                      ;ITERATION COUNT OK?
     022562  001404                          BEQ     TST233
                                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                             ;           CONDITIONAL BRANCH INST. AND     <====
                                                                             ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                             ;           WHICH FOLLOWS W/ 754             <====
     022564                          SOB4:
     022564  012742  000533                  MOV     #533,-(R2)              ;MOVE TO MAILBOX #  *******  533  *******
     022570  005242                          INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
     022572  000000                          HALT                            ;INCORRECT # OF BRANCHES OR CC'S CHANGED
                                                                             ;  OR SEQUENCE ERROR
                                     ;*******************************************************************************
                                     ;
                                     ;       THIS TEST VERIFIES THE MARK INSTRUCTION. THE EFFECTS
                                     ;OF THE MARK INSTRUCTION ARE SIMULATED BY THE PROGRAM INSTRUCTIONS.
                                     ;THE CONTENTS OF R5 AND THE STACK POINTER ARE CHECKED AFTER EACH
                                     ;OF THE TWO ROUTINES IN THE TEST.
                                     ;
                                     ;*******************************************************************************
                                     ;TEST 233       TEST MARK INSTRUCTION
                                     ;*******************************************************************************
     022574  005212                  TST233: INC     (R2)                    ;UPDATE TEST NUMBER
     022576  022712  000233                  CMP     #233,(R2)               ;SEQUENCE ERROR?
     022602  001062                          BNE     TST234-10               ;BR TO ERROR HALT ON SEQ ERROR
     022604  012706  001000                  MOV     #STBOT,SP
     022610  012746  125252                  MOV     #125252,-(SP)           ;PUT R5 VALUE ON STACK
     022614  162706  000074                  SUB     #74,SP                  ;EFFECTIVELY PUT 36 ARGUMENTS ON STACK
     022620  012705  022646                  MOV     #MRK1,R5                ;SET NEW PC IN R5
     022624  012746  006436                  MOV     #6436,-(SP)             ;PUT MARK 36 INST. ON STACK
     022630  000277                          SCC                             ;SET CC=1111
     022632  000137  000700                  JMP     @#700                   ;XFER CONTL TO MARK 36 INST. ON STACK
     022636  012742  000534                  MOV     #534,-(R2)              ;MOVE TO MAILBOX #  *******  534  *******
     022642  005242                          INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
     022644  000000                          HALT                            ;MARK INST. SHOULD HAVE JUMPED TO MRK1
     022646  101010                  MRK1:   BHI     MRK2                    ;TEST CC UNAFFECTED
     022650  100007                          BPL     MRK2                    ;IE. CC=1111
     022652  102006                          BVC     MRK2
     022654  020527  125252                  CMP     R5,#125252              ;CHECK R5 RESTORED FROM STACK
     022660  001003                          BNE     MRK2
     022662  022706  001000                  CMP     #STBOT,R6               ;CHECK STACK POINTER READJUSTED CORRECTLY.
     022666  001404                      BEQ     MRK3
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                 ;           CONDITIONAL BRANCH INST. AND    <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                 ;           WHICH FOLLOWS W/ 745            <====
     022670                      MRK2:
     022670  012742  000535              MOV     #535,-(R2)      ;MOVE TO MAILBOX #  *******  535  *******
     022674  005242                      INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     022676  000000                      HALT                    ;RESULTS OF MARK INCORRECT
     022700  012746  052525      MRK3:   MOV     #52525,-(SP)
     022704  012746  006400              MOV     #6400,-(SP)     ;PUT MARK 0 INST. ON STACK
     022710  010605                      MOV     SP,R5           ;SET ADDR. OF MARK INST. IN R5
     022712  004737  022722              JSR     PC,@#MRK4       ;DO JSR
     022716  000137  022734              JMP     @#MRK5          ;
     022722  000205              MRK4:   RTS     R5              ;DO RTS WITH R5 TO MARK INST ON STACK
     022724  012742  000536              MOV     #536,-(R2)      ;MOVE TO MAILBOX #  *******  536  *******
     022730  005242                      INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     022732  000000                      HALT                    ;RTS,MARK SEQUENCE FAILED
     022734  022706  001000      MRK5:   CMP     #STBOT,R6       ;STACK ADJUSTED CORRECTLY
```

```
022740  001003                          BNE     MRK6                    ;IF NOT:  BR
022742  022705  052525                  CMP     #52525,R5               ;CHECK IF R5 RESTORED FROM STACK
022746  001404                          BEQ     TST234
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 715             <====
022750                          MRK6:
022750  012742  000537                  MOV     #537,-(R2)              ;MOVE TO MAILBOX #  *******  537  *******
022754  005242                          INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
022756  000000                          HALT                            ;RESULTS OF MARK INCORRECT
                                                                        ;  OR SEQUENCE ERROR
                                ;*******************************************************************************
                                ;
                                ;       THIS TEST VERIFIES THAT RESET DOES NOT CLEAR THE PSW.
                                ;THE PSW IS LOADED WITH ONES, A RESET IS ISSUED, AND THE
                                ;CONTENTS OF THE PSW ARE CHECKED TO VERIFY THAT THEY HAVE NOT
                                ;CHANGED. THIS TEST IS EXECUTED ONLY ONCE EVERY 256 (DECIMAL)
                                ;PASSES.
                                ;
                                ;*******************************************************************************
                                ;TEST 234       TEST THAT RESET DOES NOT CLEAR PSW
                                ;*******************************************************************************
022760  005212                  TST234: INC     (R2)                    ;UPDATE TEST NUMBER
022762  022712  000234                  CMP     #234,(R2)               ;SEQUENCE ERROR?
022766  001014                          BNE     TST235-10               ;BR TO ERROR HALT ON SEQ ERROR
022770  123727  036066  000377          CMPB    @#PASSPT,#377                   ;ONLY DUE RESET EVERY 256. PASSES
022776  001014                          BNE     REST                            ;BR IF TO SKIP TEST
023000  012737  000357  177776          MOV     #357,@#PS                       ;MOV ONES TO PSW
023006  000005                          RESET
023010  022737  000357  177776          CMP     #357,@#PS                       ;PSW CORRECT?
023016  001404                          BEQ     TST235
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 763             <====
023020  012742  000540                  MOV     #540,-(R2)              ;MOVE TO MAILBOX #  *******  540  *******
023024  005242                          INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
023026  000000                          HALT                            ;RESET ALTERED PSW
                                                                        ;  OR SEQUENCE ERROR
023030                          REST:
                                ;*******************************************************************************
                                ;
                                ;       THE FOLLOWING TEST CHECKS THE INDEPENDENT FUNCTIONING OF BASIC
                                ;DATA PATH COMPONENTS WITH USER/SUPERVISOR  MODE SET.
                                ;
                                ;*******************************************************************************
                                ;TEST 235       TEST USER/SUPER  S.P. CAN HOLD A 1 IN EVERY BIT
                                ;*******************************************************************************
023030  005212                  TST235: INC     (R2)                    ;UPDATE TEST NUMBER
023032  022712  000235                  CMP     #235,(R2)               ;SEQUENCE ERROR?
023036  001034                          BNE     TST236-10               ;BR TO ERROR HALT ON SEQ ERROR
023040  052767  140000  154730          BIS     #USRM,PS                        ;SET USER MODE
023046  012706  000001                  MOV     #1,R6                           ;SET BIT0
023052  000241                          CLC                                     ;CLEAR C-BIT
023054  006106                  USP1:   ROL     R6                              ;ROTATE 1 POSITION
```

```
023056  103376                          BCC     USP1            ;BR IF NOT ALL DONE
023060  042767  140000  154710          BIC     #USRM,PS        ;CLEAR USER MODE
023066  001404                          BEQ     SSP1A
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 763            <====
023070  012742  000541                  MOV     #541,-(R2)      ;MOVE TO MAILBOX #  *******  541  *******
023074  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
023076  000000                          HALT                    ;USER MODE R6 PICKED A BIT
023100  042767  100000  154670  SSP1A:  BIC     #100000,PS              ;SET SUPERVISON MODE
023106  012706  000001                  MOV     #1,R6                   ;SET BIT0
023112  000241                          CLC                             ;CLEAR C-BIT
023114  006106                  SSP2:   ROL     R6                      ;ROTATE 1 POSITION
023116  103376                          BCC     SSP2                    ;BR IF NOT ALL DONE
023120  042767  140000  154650          BIC     #140000,PS              ;CLEAR SUPERVISON MODE
023126  001404                          BEQ     TST236
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 743            <====
023130  012742  000542                  MOV     #542,-(R2)      ;MOVE TO MAILBOX #  *******  542  *******
023134  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
023136  000000                          HALT                    ;SUPER MODE R6 PICKED A BIT
                                                                ;  OR SEQUENCE ERROR
023140                          USP2:


                                ;*************************************************************************
                                ;
                                ;       THIS TEST CHECKS THE INDEPENDENT FUNCTIONING OF THE USER
                                ;SUPERVISOR AND KERNEL MODE R6'S. R6 IS SETUP AND ADDRESSED IN EACH
                                ;OF THE TWO MODES TO VERIFY THAT THE TWO R6'S ARE INDEPENDENT
                                ;OF EACH OTHER.
                                ;
                                ;*************************************************************************
                                ;TEST 236       TEST INDEPENDENCE OF USER/SUPER/KERNEL MODE R6,R6
                                ;*************************************************************************
023140  005212                  TST236: INC     (R2)            ;UPDATE TEST NUMBER
023142  022712  000236                  CMP     #236,(R2)       ;SEQUENCE ERROR?
023146  001120                          BNE     TST237-10       ;BR TO ERROR HALT ON SEQ ERROR
023150  052767  140000  154620          BIS     #USRM,PS                ;SET USER MODE
023156  012706  011111                  MOV     #011111,R6                      ;SET USER R6 TO #011111
023162  042767  100000  154606          BIC     #100000,PS              ;SET SUPERVISOR MODE
023170  012706  022222                  MOV     #022222,R6                      ;SET SUPER R6 TO #022222
023174  042767  140000  154574          BIC     #140000,PS                      ;SET KERNEL MODE
023202  012706  033333                  MOV     #033333,R6                      ;SET KERNEL R6 TO #033333
023206  022706  033333                  CMP     #033333,R6                      ;VERIFY R6 WITH KERNEL
023212  001404                          BEQ     USP2A
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 755            <====
023214  012742  000543                  MOV     #543,-(R2)      ;MOVE TO MAILBOX #  *******  543  *******
023220  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
023222  000000                          HALT                    ;DUAL ADDRESSING SEQUENCE ERROR
023224  052767  040000  154544  USP2A:  BIS     #040000,PS              ;SET SUPER MODE
023232  022706  022222                  CMP     #022222,R6              ;VERIFY R6 WITH SUPER
```

```
 3522 023236  001404                          BEQ     USP3
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                      ;           CONDITIONAL BRANCH INST. AND     <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                      ;           WHICH FOLLOWS W/ 743             <====
      023240  012742  000544                  MOV     #544,-(R2)      ;MOVE TO MAILBOX #  *******  544  *******
      023244  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      023246  000000                          HALT                    ;DUAL ADDRESSING SEQUENCE ERROR
 3523 023250  052767  140000  154520  USP3:   BIS     #USRM,PS                ;SET USER MODE
 3524 023256  022706  011111                  CMP     #011111,R6                      ;VERIFY R6 WITH USER
 3525 023262  001404                          BEQ     USP4
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                      ;           CONDITIONAL BRANCH INST. AND     <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                      ;           WHICH FOLLOWS W/ 731             <====
      023264  012742  000545                  MOV     #545,-(R2)      ;MOVE TO MAILBOX #  *******  545  *******
      023270  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      023272  000000                          HALT                    ;DUAL ADDRESSING SEQUENCE ERROR
 3526 023274  042767  140000  154474  USP4:   BIC     #140000,PS              ;SET KERNEL MODE
 3527 023302  012706  044444                  MOV     #044444,R6                      ;SET R6 TO #044444
 3528 023306  052767  040000  154462          BIS     #040000,PS              ;SET SUPER MODE
 3529 023314  012706  055555                  MOV     #055555,R6                      ;SET R6 TO #055555
 3530 023320  052767  140000  154450          BIS     #140000,PS              ;SET USER MODE
 3531 023326  012706  066666                  MOV     #066666,R6                      ;SET R6 TO #066666
 3532 023332  022706  066666                  CMP     #066666,R6                      ;CHECK  R6 TO  #066666
 3533 023336  001404                          BEQ     USP5
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                      ;           CONDITIONAL BRANCH INST. AND     <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                      ;           WHICH FOLLOWS W/ 703             <====
      023340  012742  000546                  MOV     #546,-(R2)      ;MOVE TO MAILBOX #  *******  546  *******
      023344  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      023346  000000                          HALT                    ;DUAL ADDRESSING SEQUENCE ERROR
 3534 023350  042767  100000  154420  USP5:   BIC     #100000,PS              ;SET SUPER MODE
 3535 023356  022706  055555                  CMP     #055555,R6                      ;CHECK  R6  #055555
 3536 023362  001404                          BEQ     USP6
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                      ;           CONDITIONAL BRANCH INST. AND     <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                      ;           WHICH FOLLOWS W/ 671             <====
      023364  012742  000547                  MOV     #547,-(R2)      ;MOVE TO MAILBOX #  *******  547  *******
      023370  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      023372  000000                          HALT                    ;DUAL ADDRESSING SEQUENCE ERROR
 3537 023374  042767  140000  154374  USP6:   BIC     #140000,PS              ;SET KERNEL MODE
 3538 023402  022706  044444                  CMP     #044444,R6              ;CHECK R6 FOR #055555
 3539 023406  001404                          BEQ     TST237
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                      ;           CONDITIONAL BRANCH INST. AND     <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                      ;           WHICH FOLLOWS W/ 657             <====
      023410  012742  000550                  MOV     #550,-(R2)      ;MOVE TO MAILBOX #  *******  550  *******
      023414  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      023416  000000                          HALT                    ;DUAL ADDRESSING SEQUENCE ERROR
                                                                      ;  OR SEQUENCE ERROR
 3540
 3541                                 ;*******************************************************************************
 3542                                 ;
```

```
                                          ;       THESE NEXT TWO TESTS VERIFY MFPI AND MTPI INSTRUCTIONS
                                          ;WITH R6 IN MODE 0.
                                          ;
                                          ;*******************************************************************************
                                          ;TEST 237        TEST MFPI WITH R6 IN MODE 0
                                          ;*******************************************************************************
023420  005212                            TST237: INC     (R2)            ;UPDATE TEST NUMBER
023422  022712  000237                            CMP     #237,(R2)       ;SEQUENCE ERROR?
023426  001033                                    BNE     TST240-10       ;BR TO ERROR HALT ON SEQ ERROR
023430  012706  001000                            MOV     #STBOT,R6               ;INITIALIZE KERNEL STACK POINTER
023434  012767  140000  154334                    MOV     #USRM,PS                ;SET USER MODE.PREVIOUS KERNEL
023442  012706  036370                            MOV     #USTBOT,R6              ;INITIALIZE USER STACK POINTER
023446  006506                                    MFPI    R6                      ;TRY MFPI WITH MODE 0
023450  022767  140000  154320                    CMP     #140000,PS              ;CHECK PSW
023456  001410                                    BEQ     MFPI0                   ;BR IF NO ERROR
023460  042767  140000  154310                    BIC     #USRM,PS                ;CLEAR USER MODE
023466  001417                                    BEQ     TST240
                                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                          ;           CONDITIONAL BRANCH INST. AND   <====
                                                                          ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                          ;           WHICH FOLLOWS W/ 757           <====
023470  012742  000551                            MOV     #551,-(R2)      ;MOVE TO MAILBOX #  *******  551  *******
023474  005242                                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
023476  000000                                    HALT                    ;INCORRECT PSW FROM MFPI
                                                                          ;  OR SEQUENCE ERROR
023500  022767  001000  012660    MFPI0:  CMP     #STBOT,USTBOT-2         ;CHECK DATA ON STACK
023506  001407                                    BEQ     MFPI0A                  ;BR IF NO ERROR
023510  042767  140000  154260                    BIC     #USRM,PS                ;CLEAR USER MODE
023516  012742  000552                            MOV     #552,-(R2)      ;MOVE TO MAILBOX #  *******  552  *******
023522  005242                                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
023524  000000                                    HALT                    ;INCORRECT DATA FROM MFPI
023526                                    MFPI0A:

                                          ;*******************************************************************************
                                          ;TEST 240        TEST MTPI WITH R6 IN MODE 0
                                          ;*******************************************************************************
023526  005212                            TST240: INC     (R2)            ;UPDATE TEST NUMBER
023530  022712  000240                            CMP     #240,(R2)       ;SEQUENCE ERROR?
023534  001033                                    BNE     TST241-10       ;BR TO ERROR HALT ON SEQ ERROR
023536  005067  154234                            CLR     PS                      ;SET KERNEL MODE
023542  005006                                    CLR     R6                      ;INITIALIZE KERNEL R6
023544  012767  140000  154224                    MOV     #USRM,PS                ;SET USER MODE/PREVIOUS KERNEL
023552  012706  036370                            MOV     #USTBOT,R6              ;INITIALIZE USER STACK POINTER
023556  012746  001000                            MOV     #STBOT,-(R6)            ;SET UP TARGET DATA
023562  006606                                    MTPI    R6                      ;TRY MODE 0 MTPI
023564  022767  140000  154204                    CMP     #USRM,PS                ;CHECK PSW
023572  001407                                    BEQ     MTPI0                   ;BR IF NO ERROR
023574  042767  140000  154174                    BIC     #USRM,PS                ;CLEAR USER MODE
023602  012742  000553                            MOV     #553,-(R2)      ;MOVE TO MAILBOX #  *******  553  *******
023606  005242                                    INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
023610  000000                                    HALT                    ;PS INCORRECT FOLLOWING MTPI
023612  005067  154160            MTPI0:  CLR     PS                      ;SET KERNEL MODE
023616  020627  001000                            CMP     R6,#STBOT               ;CHECK TARGET DATA
023622  001404                                    BEQ     TST241
                                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                          ;           CONDITIONAL BRANCH INST. AND   <====
                                                                          ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                          ;               WHICH FOLLOWS W/ 744          <====
     023624  012742  000554                  MOV     #554,-(R2)          ;MOVE TO MAILBOX #  *******  554  *******
     023630  005242                          INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     023632  000000                          HALT                        ;DATA INCORRECT FOLLOWING MTPI
                                                                          ;  OR SEQUENCE ERROR


                                    ;**********************************************************************************
                                    ;
                                    ;       THIS TEST VERIFIES THE CONTENTS OF THE BRANCH ROM.  THE TEST
                                    ;EXECUTES EVERY POSSIBLE BRANCH WITH EVERY POSSIBLE CONDITION
                                    ;CODE COMBINATION.
                                    ;       THE ROUTINE USES TWO TABLES.  THE BRANCH TABLE HOLDS ALL THE
                                    ;POSSIBLE BRANCH INSTRUCTIONS, THE OTHER TABLE (YNTAB) HOLDS BIT MAPS FOR
                                    ;EACH BRANCH.  A ONE IN THE BIT MAP INDICATES THAT THE CORRESPONDING
                                    ;BRANCH INSTRUCTION SHOULD BRANCH FOR THE CONDITION CODE SETTING WHICH
                                    ;CORRESPONDS TO THE BIT POSITION WITHIN THE MAP.  FOR EXAMPLE IF THE LEFT
                                    ;MOST BIT IS A ONE THEN THE CORRESPONDING BRANCH INSTRUCTION SHOULD BRANCH
                                    ;WHEN THE CONDITION CODES ARE 0.
                                    ;       THE ROUTINE CONSISTS OF NESTED LOOPS; THE OUTER LOOP SETS UP
                                    ;ALL THE POSSIBLE BRANCH INSTRUCTIONS.  THE INNER LOOP SETS UP EVERY POSSIBLE
                                    ;CONDITION CODE FOR EACH BRANCH.
                                    ;       THE BIT MAP IS USED TO SET THE ADDRESS LOCATION IN TWO
                                    ;JUMP MODE 3 INSTRUCTIONS.  THE ADDRESSES ARE CHANGED TO ALLOW THE
                                    ;PROGRAM TO CONTINUE OR JUMP TO AN ERROR ROUTINE DEPENDING UPON
                                    ;WHETHER IT HANDLED THE BRANCH INSTRUCTION CORRECTLY.
                                    ;       AT ANY ERROR HALT, LOCATION, BRH, HOLDS THE BRANCH INSTRUCTION
                                    ;UNDER TEST AND LOCATION, CC, HOLDS THE VALUE OF THE CONDITION CODES
                                    ;AT THE TIME THE BRANCH WAS EXECUTED.
                                    ;
                                    ;**********************************************************************************
                                    ;TEST 241       TEST THE BRANCH ROM
                                    ;**********************************************************************************
     023634  005212                 TST241: INC     (R2)                ;UPDATE TEST NUMBER
     023636  022712  000241                 CMP     #241,(R2)           ;SEQUENCE ERROR?
     023642  001062                         BNE     ER                  ;BR TO ERROR HALT ON SEQ ERROR
     023644  012700  036142         SETUP:  MOV     #BRTAB,R0           ;INITIALIZE BRANCH TABLE POINTER
     023650  012704  036216                 MOV     #YNTAB,R4           ;INITIALIZE YES/NO BRANCH MAP POINTER
     023654  012767  000017  000142         MOV     #15.,BRCT           ;INITIALIZE BRANCH TABLE COUNT
     023662  012067  000110         SETBR:  MOV     (R0)+,BRH           ;GET NEXT BRANCH INST.
     023666  012401                         MOV     (R4)+,R1            ;GET NEXT BRANCH MAP
     023670  012767  177777  000074         MOV     #-1,CC              ;INITIALIZE CONDITION CODE VALUE
     023676  012703  000020                 MOV     #16.,R3             ;INITIALIZE CONDITION CODE COUNT
     023702  005267  000064         SETCC:  INC     CC                  ;SET FOR NEXT CC VALUE
     023706  032701  100000                 BIT     #100000,R1          ;SEE IF SHOULD BR W/ THESE CC'S
     023712  013705  177776                 MOV     @#177776,R5         ;SIMULATE A JNE
     023716  042705  177773                 BIC     #177773,R5          ;       (JUMP NOT EQUAL)
     023722  000165  023726                 JMP     .+4(R5)             ;       TO SET2BR
     023726  000167  000020                 JMP     SET2BR
     023732  012767  024026  000042         MOV     #CONT,NBR           ;SET TO CONTINUE IF NO BRANCH
     023740  012767  024010  000040         MOV     #ER,YBR             ;SET TO REPORT ERROR IF BRANCH
     023746  000167  000014                 JMP     AROUND              ;GO AROUND OPPOSITE CONDITION
     023752  012767  024010  000022 SET2BR: MOV     #ER,NBR             ;SET TO REPORT ERROR IF NO BRANCH
     023760  012767  024026  000020         MOV     #CONT,YBR           ;SET TO CONTINUE IF BRANCH
     023766  006101                 AROUND: ROL     R1                  ;UPDATE BIT MAP

     023770  012737                         MOV     (PC)+,@(PC)+        ;SET CONDITION CODE
```

```
023772  000000                  CC:     0                       ;NEW CC VALUE GOES HERE
023774  177776                          177776
023776  000000                  BRH:    0                       ;BRANCH INST. GOES HERE
024000  000137                          JMP     @(PC)+          ;THIS JUMP IF NO BRANCH
024002  000000                  NBR:    0                       ;WHERE TO GO IF NO BRANCH OCCURS
024004  000137                          JMP     @(PC)+          ;THIS JUMP IF BRANCH OCCURS
024006  000000                  YBR:    0                       ;WHERE TO GO IF BRANCH OCCURS
024010  012702  000304          ER:     MOV     #$TESTN,R2      ;RESTORE POINTER
024014  012742  000555                  MOV     #555,-(R2)      ;MOVE TO MAILBOX #  *******  555  *******
024020  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
024022  000000                          HALT                    ;
024024  000000                  BRCT:   0
024026  005303                  CONT:   DEC     R3              ;CC'S DONE?
024030  013705  177776                  MOV     @#177776,R5     ;SIMULATE A JNE
024034  042705  177773                  BIC     #177773,R5      ;       (JUMP NOT EQUAL)
024040  000165  024044                  JMP     .+4(R5)         ;       TO SETCC
024044  000167  177632                  JMP     SETCC
024050  005367  177750                  DEC     BRCT            ;BR'S DONE?
024054  013705  177776                  MOV     @#177776,R5     ;SIMULATE A JNE
024060  042705  177773                  BIC     #177773,R5      ;       (JUMP NOT EQUAL)
024064  000165  024070                  JMP     .+4(R5)         ;       TO SETBR
024070  000167  177566                  JMP     SETBR

                                ;*******************************************************************************
                                ;
                                ;THE FOLLOWING TEST VERIFIES THAT NO DUAL ADDRESSING OF THE GENERAL
                                ;REGISTERS OCCURS. ALL REGISTERS ARE CLEARED, AND A UNIQUE BIT IS SET
                                ;IN EACH. CMP INSTRUCTIONS CHECK THAT ONLY ONE BIT IS SET IN EACH
                                ;REGISTER.
                                ;
                                ;*******************************************************************************
                                ;TEST 242       DUAL REGISTER ADDRESSING TEST
                                ;*******************************************************************************
024074  005212                  TST242: INC     (R2)            ;UPDATE TEST NUMBER
024076  022712  000242                  CMP     #242,(R2)       ;SEQUENCE ERROR?
024102  001052                          BNE     DAERR           ;BR TO ERROR HALT ON SEQ ERROR
024104  005000                  BITCLR: CLR     R0              ;INITIALIZE ALL REGISTERS
024106  005001                          CLR     R1
024110  005002                          CLR     R2
024112  005003                          CLR     R3
024114  005004                          CLR     R4
024116  005005                          CLR     R5
024120  005006                          CLR     R6
024122  052700  000001          BITSET: BIS     #1,R0           ;SET R0=1
024126  052701  000002                  BIS     #2,R1           ;R1=2
024132  052702  000004                  BIS     #4,R2           ;R2=4
024136  052703  000010                  BIS     #10,R3          ;R3=10
024142  052704  000020                  BIS     #20,R4          ;R4=20
024146  052705  000040                  BIS     #40,R5          ;R5=40
024152  052706  000100                  BIS     #100,R6         ;R6=100
024156  022706  000100          BITCHK: CMP     #100,R6         ;TEST THAT NO DUAL ADDRESSING OCCURRED
024162  001022                          BNE     DAERR           ;BR TO ERROR HALT IF ANY OTHER BITS ARE SET
024164  022705  000040                  CMP     #40,R5
024170  001017                          BNE     DAERR
024172  022704  000020                  CMP     #20,R4
024176  001014                          BNE     DAERR
024200  022703  000010                  CMP     #10,R3
```

```
   3663 024204  001011                             BNE     DAERR
   3664 024206  022702  000004                     CMP     #4,R2
   3665 024212  001006                             BNE     DAERR
   3666 024214  022701  000002                     CMP     #2,R1
   3667 024220  001003                             BNE     DAERR
   3668 024222  022700  000001                     CMP     #1,R0
   3669 024226  001404                             BEQ     BITCON
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 725            <====
        024230                             DAERR:
        024230  012742  000556                     MOV     #556,-(R2)     ;MOVE TO MAILBOX #  *******  556  *******
        024234  005242                             INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
        024236  000000                             HALT                   ;DUAL ADDRESSING ERROR
   3670 024240  012702  000304             BITCON: MOV     #$TESTN,R2     ;RESTORE POINTER
   3671
   3672                                    ;*******************************************************************************
   3673                                    ;        THIS TEST VERIFIES THAT THE UPPER BYTE OF THE PSW IS NOT AFFECTED
   3674                                    ;WHEN THE PRIORITY LEVEL OR CC'S ARE CHANGED. ALL BITS ARE
   3675                                    ;INITIALLY SET IN THE PSW, AND THE LOW BYTE IS CLEARED. A BIT
   3676                                    ;INSTRUCTION VERIFIES THE DATA.
   3677                                    ;
   3678                                    ;*******************************************************************************
                                           ;TEST 243        TEST BYTE INSTRUCTION ON PSW
                                           ;*******************************************************************************
        024244  005212                     TST243: INC     (R2)           ;UPDATE TEST NUMBER
        024246  022712  000243                     CMP     #243,(R2)      ;SEQUENCE ERROR?
        024252  001012                             BNE     BTERR          ;BR TO ERROR HALT ON SEQ ERROR
   3679 024254  052737  170357  177776             BIS     #170357,@#PS   ;SET ALL POSSIBLE BITS IN PSW
   3680 024262  105037  177776                     CLRB    @#PS           ;CLR PR LEVEL AND CC'S
   3681 024266  013700  177776                     MOV     @#PS,R0        ;COPY CONTENTS OF PSW
   3682 024272  032700  170000                     BIT     #170000,R0     ;TEST THAT UPPER BYTE IS UNAFFECTED
   3683 024276  001006                             BNE     BTCON          ;CONTINUE IF OK
   3684 024300  005037  177776             BTERR:  CLR     @#PS           ;RETURN TO KERNEL MODE
   3685 024304  012742  000557                     MOV     #557,-(R2)     ;MOVE TO MAILBOX #  *******  557  *******
        024310  005242                             INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
        024312  000000                             HALT                   ;BYTE INSTRUCTION ALTERED PSW
   3686 024314  005037  177776             BTCON:  CLR     @#PS           ;RETURN TO KERNEL MODE
   3687
   3688                                    ;*******************************************************************************
   3689                                    ;
   3690                                    ;        THIS TEST VERIFIES THAT A JMP INSTRUCTION DOES NOT ALTER THE
   3691                                    ;CONDITION CODES IN THE PSW. THE CC'S ARE PRESET,THE JMP IS
   3692                                    ;EXECUTED, AND CONDITIONAL BRANCHES VERIFY THE STATE OF THE CC'S.
   3693                                    ;
   3694                                    ;*******************************************************************************
                                           ;TEST 244        TEST THAT JMP OPCODE DOES NOT AFFECT C.C.'S
                                           ;*******************************************************************************
        024320  005212                     TST244: INC     (R2)           ;UPDATE TEST NUMBER
        024322  022712  000244                     CMP     #244,(R2)      ;SEQUENCE ERROR?
        024326  001010                             BNE     TST245-10      ;BR TO ERROR HALT ON SEQ ERROR
   3695 024330  000277                             SCC
   3696 024332  000252                             +CLN!CLV               ;CC=0101
   3697 024334  000167  000000                     JMP     JMPT           ;JUMP TO TEST PSW
   3698 024340  100403                     JMPT:   BMI     JMPERR         ;BR TO ERROR HALT IF N-BIT IS SET
   3699 024342  001002                             BNE     JMPERR         ;BR TO ERROR HALT IF Z-BIT IS CLEAR
```

```
 3700 024344  102401                          BVS     JMPERR          ;BR TO ERROR HALT IF V-BIT IF SET
 3701 024346  103404                          BCS     TST245
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 767            <====
      024350                          JMPERR:
      024350  012742  000560                  MOV     #560,-(R2)      ;MOVE TO MAILBOX #  *******  560  *******
      024354  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      024356  000000                          HALT                    ;JMP INSTRUCTION AFFECTED CC'S
                                                                      ;  OR SEQUENCE ERROR
 3702                                 ;*******************************************************************************
 3703                                 ;
 3704                                 ;       THIS TEST VERIFIES THE SET AND CLEAR CONDITION CODE INSTRUCTIONS.
 3705                                 ;THE TEST CONSISTS OF TWO ROUTINES, ONE TO TEST ALL CLEAR CC
 3706                                 ;INSTRUCTIONS, AND THE SECOND TO TEST ALL SET CC INSTRUCTIONS. ALL
 3707                                 ;POSSIBLE COMBINATIONS OF CONDITION CODES ARE TESTED, INCLUDING NOP'S.
 3708                                 ;       TO TEST THE CLEAR CC INSTRUCTIONS, ALL CONDITION CODES ARE
 3709                                 ;INITIALLY SET. THE INSTRUCTION IS EXECUTED, AND THE PSW IS CHECKED
 3710                                 ;TO VERIFY THE PROPER COMBINATION OF CONDITION CODES.
 3711                                 ;       TO TEST THE SET CC INSTRUCTIONS, THE CONDITION CODES ARE
 3712                                 ;INITIALLY CLEARED, AND ONLY THE REQUIRED BITS ARE SET BY THE SET CC
 3713                                 ;INSTRUCTION. THE CONTENTS OF THE PSW ARE CHECKED TO VERIFY THAT
 3714                                 ;ONLY THE REQUIRED BITS WERE SET.
 3715                                 ;
 3716                                 ;*******************************************************************************
                                      ;TEST 245       TEST SET CC AND CLEAR CC INSTRUCTIONS
                                      ;*******************************************************************************
      024360  005212                  TST245: INC     (R2)            ;UPDATE TEST NUMBER
      024362  022712  000245                  CMP     #245,(R2)       ;SEQUENCE ERROR?
      024366  001062                          BNE     CCERR           ;BR TO ERROR HALT ON SEQ ERROR
 3717 024370  012767  000240  000024          MOV     #240,CC1        ;INITIALIZE CLR CC INSTRUCTION CODES
 3718 024376  012767  000017  000032          MOV     #17,CC2         ;INITIALIZE OCTAL MAP
 3719 024404  012767  000261  000102          MOV     #261,SC3        ;INITIALIZE SET CC INSTRUCTION CODES
 3720 024412  012767  000001  000110          MOV     #1,SC4          ;INITIALIZE OCTAL MAP
 3721 024420  000277                  CLRCD:  SCC                     ;SET ALL CONDITION CODES
 3722 024422  000000                  CC1:    0                       ;CONDITION CODE INSTRUCTION
 3723 024424  013704  177776                  MOV     @#PS,R4         ;COPY THE PSW
 3724 024430  042704  177760                  BIC     #177760,R4      ;ISOLATE CONDITION CODES
 3725 024434  022704                          CMP     (PC)+,R4        ;CHECK THAT PROPER CC'S WERE CLEARED
 3726 024436  000000                  CC2:    0                       ;OCTAL REPRESENTATION OF CC'S
 3727 024440  001404                          BEQ     CON1
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 752            <====
      024442  012742  000561                  MOV     #561,-(R2)      ;MOVE TO MAILBOX #  *******  561  *******
      024446  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      024450  000000                          HALT                    ;CLEAR CC INSTRUCTION FAILED
 3728 024452  005367  177760          CON1:   DEC     CC2             ;SET NEXT OCTAL MAP OF CC'S
 3729 024456  005267  177740                  INC     CC1             ;GET NEXT CLEAR CC INSTRUCTION
 3730 024462  026727  177734  000257          CMP     CC1,#257        ;TEST FOR CCC INSTRUCTION
 3731 024470  003753                          BLE     CLRCD           ;GO TEST NEXT INSTRUCTION IF NOT FOUND
 3732 024472  026727  177724  000260          CMP     CC1,#260        ;CHECK FOR NOP=260
 3733 024500  001004                          BNE     SETCD           ;GO TEST SET CC INSTRUCTIONS
 3734 024502  012767  000017  177726          MOV     #17,CC2         ;SET OCTAL MAP TO TEST NOP
 3735 024510  000743                          BR      CLRCD           ;GO TEST NOP
```

```
3736 024512  000257                          SETCD:  CCC                     ;CLEAR ALL CONDITION CODES
3737 024514  000000                          SC3:    0                       ;CONDITION CODE INSTRUCTION
3738 024516  013704  177776                          MOV     @#PS,R4         ;COY PSW
3739 024522  042704- 177760                          BIC     #177760,R4      ;CLEAR AWAY UNWANTED BITS
3740 024526  022704                                  CMP     (PC)+,R4        ;CHECK THAT PROPER CC'S WERE SET
3741 024530  000000                          SC4: -  0                       ;OCTAL REPRESENTATION OF CC'S
3742 024532  001404                                  BEQ     CON2
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                         ;           CONDITIONAL BRANCH INST. AND    <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                         ;           WHICH FOLLOWS W/ 715            <====
     024534                                  CCERR:
     024534  012742  000562                          MOV     #562,-(R2)      ;MOVE TO MAILBOX #  *******  562  *******
     024540  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     024542  000000                                  HALT                    ;SET CC FAILED OR SEQUENCE ERROR
3743 024544  005267  177760                  CON2:   INC     SC4             ;SET NEXT OCTAL MAP
3744 024550  005267  177740                          INC     SC3             ;PREPARE NEXT SET CC INSTRUCTION
3745 024554  026727  177734  000277                  CMP     SC3,#277        ;FINISHED?
3746 024562  003753                                  BLE     SETCD           ;BR IF NO
3747
3748                                         ;*****************************************************************************
3749                                         ;
3750                                         ;       THESE NEXT TWO TEST VERIFY MFPD AND MTPD INSTRUCTIONS
3751                                         ;WITH R6 IN MODE 0.
3752                                         ;
3753                                         ;*****************************************************************************
                                             ;TEST 246        TEST MFPD WITH R6 IN MODE 0
                                             ;*****************************************************************************
     024564  005212                          TST246: INC     (R2)            ;UPDATE TEST NUMBER
     024566  022712  000246                          CMP     #246,(R2)       ;SEQUENCE ERROR?
     024572  001032                                  BNE     TST247-10       ;BR TO ERROR HALT ON SEQ ERROR
3754 024574  012706  001000                          MOV     #STBOT,R6               ;INITIALIZE KERNEL STACK POINTER
3755 024600  012767  140000  153170                  MOV     #USRM,PS                ;SETUP USER MODE .PREVIOUS KERNEL
3756 024606  012706  036370                          MOV     #USTBOT,R6              ;INITIALIZE USER STACK POINTER
3757 024612  106506                                  MFPD    R6                      ;TRY MFPD WITH MODE 0
3758 024614  022767  140000  153154                  CMP     #140000,PS              ;CHECK PSW
3759 024622  001407                                  BEQ     MFPD0                   ;BR IF NO ERROR
3760 024624  042767  140000  153144                  BIC     #USRM,PS                ;CLEAR USER MODE
3761 024632  012742  000563                          MOV     #563,-(R2)      ;MOVE TO MAILBOX #  *******  563  *******
     024636  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     024640  000000                                  HALT                    ;INCORRECT PSW FROM MFPD
3762 024642  022767  001000  011516  MFPD0:  CMP     #STBOT,USTBOT-2         ;CHECK DATA ON STACK
3763 024650  001407                                  BEQ     MFPD0A                  ;BR IF NO ERROR
3764 024652  042767  140000  153116                  BIC     #USRM,PS                ;CLEAR USER MODE
3765 024660  012742  000564                          MOV     #564,-(R2)      ;MOVE TO MAILBOX #  *******  564  *******
     024664  005242                                  INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     024666  000000                                  HALT                    ;INCORRECT DATA FROM MFPD
3766 024670                                  MFPD0A:
3767
3768                                         ;*****************************************************************************
                                             ;TEST 247        TEST MTPD WITH R6 IN MODE 0
                                             ;*****************************************************************************
     024670  005212                          TST247: INC     (R2)            ;UPDATE TEST NUMBER
     024672  022712  000247                          CMP     #247,(R2)       ;SEQUENCE ERROR?
     024676  001031                                  BNE     TST250-10       ;BR TO ERROR HALT ON SEQ ERROR
3769 024700  005067  153072                          CLR     PS                      ;SET KERNEL MODE
3770 024704  005006                                  CLR     R6                      ;INITIALIZE KERNEL R6
```

```
3771 024706 012767 140000 153062          MOV     #USRM,PS                   ;SET USER MODE/PREVIOUS KERNEL
3772 024714 012746 001000                 MOV     #STBOT,-(R6)               ;SET UP TARGET DATA
3773 024720 106606                        MTPD    R6                         ;TRY MODE 0 MTPD
3774 024722 022767 140000 153046          CMP     #USRM,PS                   ;CHECK PSW
3775 024730 001407                        BEQ     MTPD0                      ;BR IF NO ERROR
3776 024732 042767 140000 153036          BIC     #USRM,PS                   ;CLEAR USER MODE
3777 024740 012742 000565                 MOV     #565,-(R2)         ;MOVE TO MAILBOX #  *******  565  *******
     024744 005242                        INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     024746 000000                        HALT                       ;PS INCORRECT FOLLOWING MTPD
3778 024750 005067 153022         MTPD0:  CLR     PS                         ;SET KERNEL MODE
3779 024754 020627 001000                 CMP     R6,#STBOT                  ;CHECK TARGET DATA
3780 024760 001404                        BEQ     TST250
                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                             ;           CONDITIONAL BRANCH INST. AND     <====
                                                             ;           REPLACE THE MOVE INSTRUCTION     <====
                                                             ;           WHICH FOLLOWS W/ 746             <====
     024762 012742 000566                 MOV     #566,-(R2)         ;MOVE TO MAILBOX #  *******  566  *******
     024766 005242                        INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     024770 000000                        HALT                       ;DATA INCORRECT FOLLOWING MTPD
                                                                     ;  OR SEQUENCE ERROR
3781
3782                                      ;*******************************************************************************
3783                                      ;*******************************************************************************
                                          ;TEST 250        TEST MFPT INSTRUCTION
                                          ;*******************************************************************************
     024772 005212                TST250: INC     (R2)               ;UPDATE TEST NUMBER
     024774 022712 000250                 CMP     #250,(R2)          ;SEQUENCE ERROR?
     025000 001005                        BNE     TST251-10          ;BR TO ERROR HALT ON SEQ ERROR
3784 025002 005000                        CLR     R0                         ;SET UP R0
3785 025004 000007                        MFPT                       ;MOVE FROM PROCSSOR TYPE
3786 025006 122700 000001                 CMPB    #1,R0                      ;CHECK FOR A ONE IN R0
3787 025012 001404                        BEQ     TST251
                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                             ;           CONDITIONAL BRANCH INST. AND     <====
                                                             ;           REPLACE THE MOVE INSTRUCTION     <====
                                                             ;           WHICH FOLLOWS W/ 772             <====
     025014 012742 000567                 MOV     #567,-(R2)         ;MOVE TO MAILBOX #  *******  567  *******
     025020 005242                        INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     025022 000000                        HALT                       ;MFPT FAILED TO RETURN A 1,IN R0
                                                                     ;  OR SEQUENCE ERROR
3788
3789                                      ;*******************************************************************************
3790
3791                                      ;
3792                                                  .SBTTL BIT TEST OF PIRQ REGISTER
3793                                      ;A COUNT PATTERN IS THEN RUN THRU THE REGISTER TO ENSURE THAT
3794                                      ;THE ENCODER FUNCTIONS PROPERLY.
3795                                      ;
3796                                      ;*******************************************************************************
                                          ;TEST 251        BIT TEST OF PIRQ REGISTER
                                          ;*******************************************************************************
     025024 005212                TST251: INC     (R2)               ;UPDATE TEST NUMBER
     025026 022712 000251                 CMP     #251,(R2)          ;SEQUENCE ERROR?
     025032 001064                        BNE     TST252-10          ;BR TO ERROR HALT ON SEQ ERROR
3797 025034 012706 001000                 MOV     #STBOT,SP                  ;INITIALIZE THE SP
3798 025040 012767 025054 011144          MOV     #4$,$LPADR                 ;SETUP LOOP ADR
3799 025046 012767 025054 011140          MOV     #4$,$LPERR                 ;SETUP ERROR LOOP
```

```
025054  052737  000340  177776  4$:     BIS     #340,@#177776                 ;SET THE CPU PRIORITY AT 7.
025062  005067  011112                  CLR     $TMP0                 ;SETUP COMPARISON LOCATION
025066  005037  177772                  CLR     @#PIRQ                ;CLEAR PIRQ REGISTER
025072  026737  011102  177772          CMP     $TMP0,@#PIRQ          ;DID PIRQ CLEAR
025100  001035                          BNE     1$                    ;BRANCH IF NO
025102  012700  000177                  MOV     #177,R0               ;SETUP ITTERATION COUNT
025106  012767  001042  011064          MOV     #1042,$TMP0           ;SETUP COMPARISON LOCATION
025114  012701  000002                  MOV     #2,R1                 ;SETUP R1
025120  062737  001000  177772  2$:     ADD     #1000,@#PIRQ          ;START COUNT PATTERN
025126  026737  011046  177772          CMP     $TMP0,@#PIRQ          ;DID REGISTER SET CORRECT?
025134  001017                          BNE     1$                    ;BRANCH IF NO
025136  120137  177773                  CMPB    R1,@#PIRQ+1           ;IS PIRQ READY TO GO TO NEXT LEVEL?
025142  001005                          BNE     3$                    ;BRANCH IF NO
025144  062767  000042  011026          ADD     #42,$TMP0             ;INCREMENT ENCODED VALUE IN TEST LOC.
025152  005201                          INC     R1                    ;SETUP R1 FOR ROTATE
025154  006101                          ROL     R1                    ;SET R1 TO NEXT CHECK LEVEL
025156  062767  001000  011014  3$:     ADD     #1000,$TMP0           ;INC. PIRQ LEVEL IN TEST LOCATION
025164  077023                          SOB     R0,2$                 ;CONTINUE COUNT
025166  005037  177772                  CLR     @#PIRQ                ;ENSURE PIRQ CLEAR
025172  000410                          BR      EIS           ;GO TO NEXT TEST
025174  013767  177772  011006  1$:     MOV     @#PIRQ,$EPIRQ         ;SAVE PIRQ FOR ERROR CHECKING
025202  001404                          BEQ     TST252
                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                       ;           WHICH FOLLOWS W/ 713            <====
025204  012742  000570                  MOV     #570,-(R2)    ;MOVE TO MAILBOX #  *******  570  *******
025210  005242                          INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
025212  000000                          HALT                  ;PIRQ REG. FAILED
                                                       ;  OR SEQUENCE ERROR
025214                          EIS:
```

```
                                                .SBTTL EIS ASH/ASCH/MUL/DIV TESTS
                                                .SBTTL ASH SHIFTING RIGHT USING DM2 REG 7
                                                         ;SHIFT RIGHT CLEAR N-BIT AND C-BIT
                                                         ;MODE 2-REG 7
                                        ;*******************************************************************************
                                        ;TEST 252        ASH 40000 SHIFTED BY 177765=10 PS=0
                                        ;*******************************************************************************
     025214  005212                     TST252: INC     (R2)            ;UPDATE TEST NUMBER
     025216  022712  000252                     CMP     #252,(R2)       ;SEQUENCE ERROR?
     025222  001026                             BNE     TST253-10       ;BR TO ERROR HALT ON SEQ ERROR
     025224  012706  001000                     MOV     #STBOT,R6
     025230  005037  177776                     CLR     @#PS
     025234  012700  040000                     MOV     #40000,R0       ;LOAD R0 WITH 40000
     025240  072027  177765                     ASH     #177765,R0      ;SHIFT R0 BY 177765
     025244  013767  177776  011216             MOV     @#PS,SPSW       ;SAVE PS
     025252  122767  000000  011210             CMPB    #0,SPSW         ;IS THE PS 0?
     025260  001404                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 760           <====
     025262  012742  000571                     MOV     #571,-(R2)      ;MOVE TO MAILBOX #  *******  571  *******
     025266  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     025270  000000                             HALT                    ;THE PS IS NOT EQUAL TO 0
     025272  022700  000010             1$:     CMP     #10,R0          ;IS THE RESULT 10?
     025276  001404                             BEQ     TST253
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
     025300  012742  000572                     MOV     #572,-(R2)      ;MOVE TO MAILBOX #  *******  572  *******
     025304  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     025306  000000                             HALT                    ;R0 IS NOT EQUAL TO 10
                                                                        ;   OR SEQUENCE ERROR

                                                         ;SHIFT RIGHT SET N-BIT CLEAR C-BIT
                                                         ;MODE 2 /REG 7
                                        ;*******************************************************************************
                                        ;TEST 253        ASH 125252 SHIFTED BY -2=165252 PS=11
                                        ;*******************************************************************************
     025310  005212                     TST253: INC     (R2)            ;UPDATE TEST NUMBER
     025312  022712  000253                     CMP     #253,(R2)       ;SEQUENCE ERROR?
     025316  001022                             BNE     TST254-10       ;BR TO ERROR HALT ON SEQ ERROR
     025320  012700  125252                     MOV     #125252,R0      ;LOAD R0 WITH 125252
     025324  072027  177776                     ASH     #-2,R0          ;SHIFT R0 BY -2
     025330  013767  177776  011132             MOV     @#PS,SPSW       ;SAVE PS
     025336  122767  000011  011124             CMPB    #11,SPSW                ;IS THE PS 11?
     025344  001404                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
     025346  012742  000573                     MOV     #573,-(R2)      ;MOVE TO MAILBOX #  *******  573  *******
     025352  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     025354  000000                             HALT                    ;THE PS IS NOT EQUAL TO 11
     025356  022700  165252             1$:     CMP     #165252,R0      ;IS THE RESULT 165252?
     025362  001404                          BEQ     TST254
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                     ;           CONDITIONAL BRANCH INST. AND    <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                     ;           WHICH FOLLOWS W/ 755            <====
     025364  012742  000574                  MOV     #574,-(R2)      ;MOVE TO MAILBOX #  *******  574  *******
     025370  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     025372  000000                          HALT                    ;R0 IS NOT EQUAL TO 165252
                                                                     ;  OR SEQUENCE ERROR


                                                     ;SHIFT RIGHT CLEAR N-BIT SET Z-BIT
                                                     ;MODE 2 /REG 7
                                     ;*******************************************************************************************
                                     ;TEST 254       ASH 0 SHIFTED BY -16. =0 PS=4
                                     ;*******************************************************************************************
     025374  005212                  TST254: INC     (R2)            ;UPDATE TEST NUMBER
     025376  022712  000254                  CMP     #254,(R2)       ;SEQUENCE ERROR?
     025402  001022                          BNE     TST255-10       ;BR TO ERROR HALT ON SEQ ERROR
     025404  012700  000000                  MOV     #0,R0           ;LOAD R0 WITH 0
     025410  072027  177760                  ASH     #-16.,R0        ;SHIFT R0 BY -16.
     025414  013767  177776  011046          MOV     @#PS,SPSW       ;SAVE PS
     025422  122767  000004  011040          CMPB    #4,SPSW         ;IS THE PS 4?
     025430  001404                          BEQ     1$
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                     ;           CONDITIONAL BRANCH INST. AND    <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                     ;           WHICH FOLLOWS W/ 764            <====
     025432  012742  000575                  MOV     #575,-(R2)      ;MOVE TO MAILBOX #  *******  575  *******
     025436  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     025440  000000                          HALT                    ;THE PS IS NOT EQUAL TO 4
     025442  022700  000000          1$:     CMP     #0,R0           ;IS THE RESULT 0?
     025446  001404                          BEQ     TST255
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                     ;           CONDITIONAL BRANCH INST. AND    <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                     ;           WHICH FOLLOWS W/ 755            <====
     025450  012742  000576                  MOV     #576,-(R2)      ;MOVE TO MAILBOX #  *******  576  *******
     025454  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     025456  000000                          HALT                    ;R0 IS NOT EQUAL TO 0
                                                                     ;  OR SEQUENCE ERROR

                                             .SBTTL ASH SHIFTING LEFT STORE ASH DM2 REG 7
                                                     ;SHIFT LEFT SET C-BIT=0 STORE ASH
                                                     ;MODE 2 /REG 7
                                     ;*******************************************************************************************
                                     ;TEST 255       ASH 0 SHIFTED BY 0=0 PS=4
                                     ;*******************************************************************************************
     025460  005212                  TST255: INC     (R2)            ;UPDATE TEST NUMBER
     025462  022712  000255                  CMP     #255,(R2)       ;SEQUENCE ERROR?
     025466  001022                          BNE     TST256-10       ;BR TO ERROR HALT ON SEQ ERROR
     025470  012700  000000                  MOV     #0,R0           ;LOAD R0 WITH 0
     025474  072027  000000                  ASH     #0,R0           ;SHIFT R0 BY 0
     025500  013767  177776  010762          MOV     @#PS,SPSW       ;SAVE PS
     025506  122767  000004  010754          CMPB    #4,SPSW         ;IS THE PS 4?
     025514  001404                          BEQ     1$
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                     ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;               WHICH FOLLOWS W/ 764            <====
      025516  012742  000577                      MOV     #577,-(R2)    ;MOVE TO MAILBOX #  *******  577  *******
      025522  005242                              INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
      025524  000000                              HALT                  ;THE PS IS NOT EQUAL TO 4
      025526  022700  000000              1$:     CMP     #0,R0         ;IS THE RESULT 0?
      025532  001404                              BEQ     TST256
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS        <====
                                                                        ;               CONDITIONAL BRANCH INST. AND    <====
                                                                        ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;               WHICH FOLLOWS W/ 755            <====
      025534  012742  000600                      MOV     #600,-(R2)    ;MOVE TO MAILBOX #  *******  600  *******
      025540  005242                              INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
      025542  000000                              HALT                  ;R0 IS NOT EQUAL TO 0
                                                                        ;  OR SEQUENCE ERROR



                                                  .SBTTL ASH SHIFTING LEFT DM6 REG 7
                                                          ;SHIFT LEFT SET C-BIT=1
                                                          ;MODE 6 /REG 7
                                          ;*******************************************************************************
                                          ;TEST 256         ASH 125252 SHIFTED BY S1=125250 PS=12
                                          ;*******************************************************************************
      025544  005212                      TST256: INC     (R2)          ;UPDATE TEST NUMBER
      025546  022712  000256                      CMP     #256,(R2)     ;SEQUENCE ERROR?
      025552  001024                              BNE     TST257-10     ;BR TO ERROR HALT ON SEQ ERROR
      025554  012700  125252                      MOV     #125252,R0    ;LOAD R0 WITH 125252
      025560  012704  036476                      MOV     #S1,R4        ;SET UP R4
      025564  072067  010706                      ASH     S1,R0         ;SHIFT R0 BY S1
      025570  013767  177776  010672              MOV     @#PS,SPSW     ;SAVE PS
      025576  122767  000012  010664              CMPB    #12,SPSW              ;IS THE PS 12?
      025604  001404                              BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS        <====
                                                                        ;               CONDITIONAL BRANCH INST. AND    <====
                                                                        ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;               WHICH FOLLOWS W/ 762            <====
      025606  012742  000601                      MOV     #601,-(R2)    ;MOVE TO MAILBOX #  *******  601  *******
      025612  005242                              INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
      025614  000000                              HALT                  ;THE PS IS NOT EQUAL TO 12
      025616  022700  125250              1$:     CMP     #125250,R0    ;IS THE RESULT 125250?
      025622  001404                              BEQ     TST257
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS        <====
                                                                        ;               CONDITIONAL BRANCH INST. AND    <====
                                                                        ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;               WHICH FOLLOWS W/ 753            <====
      025624  012742  000602                      MOV     #602,-(R2)    ;MOVE TO MAILBOX #  *******  602  *******
      025630  005242                              INC     -(R2)         ;SET MSGTYP TO FATAL ERROR
      025632  000000                              HALT                  ;R0 IS NOT EQUAL TO 177525
                                                                        ;  OR SEQUENCE ERROR

                                                  .SBTTL ASH SHIFTING LEFT TEST SIGN Z-BIT DM7 REG 7
                                                          ;SHIFT LEFT COUNT DOWN TO ZERO TEST SIGN Z-BIT
                                                          ;MODE 7 /REG 7
                                          ;*******************************************************************************
                                          ;TEST 257         ASH 125252 SHIFTED BY @S2= 177525 PS=10
                                          ;*******************************************************************************
      025634  005212                      TST257: INC     (R2)          ;UPDATE TEST NUMBER
```

```
     025636  022712  000257                  CMP     #257,(R2)        ;SEQUENCE ERROR?
     025642  001024                          BNE     TST260-10        ;BR TO ERROR HALT ON SEQ ERROR
3892 025644  012700  125252                  MOV     #125252,R0       ;LOAD R0 WITH 125252
3893 025650  012703  036504                  MOV     #S4,R3           ;SET UP R3
3894 025654  072077  010624                  ASH     @S4,R0           ;SHIFT R0 BY @S2
3895 025660  013767  177776  010602          MOV     @#PS,SPSW        ;SAVE PS
3896 025666  122767  000010  010574          CMPB    #10,SPSW                 ;IS THE PS 10?
3897 025674  001404                          BEQ     1$
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 762            <====
     025676  012742  000603                  MOV     #603,-(R2)       ;MOVE TO MAILBOX #  *******  603  *******
     025702  005242                          INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     025704  000000                          HALT                     ;THE PS IS NOT EQUAL TO 10
3898 025706  022700  177525          1$:     CMP     #177525,R0       ;IS RESULT 177525?
3899 025712  001404                          BEQ     TST260
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 753            <====
     025714  012742  000604                  MOV     #604,-(R2)       ;MOVE TO MAILBOX #  *******  604  *******
     025720  005242                          INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     025722  000000                          HALT                     ;R0 IS NOT EQUAL TO 177525
                                                                      ;  OR SEQUENCE ERROR
3900
3901                                         .SBTTL ASH SHIFTING LEFT TESTING IR9 FOR ASH/ASHC DM3 REG 7
3902                                                 ;SHIFT LEFT TEST IR9 TO DETERMINE ASH/ASHC
3903                                                 ;MODE 3 /REG 7
3904                                 ;*******************************************************************************
                                     ;TEST 260       ASH 125252 SHIFTED BY @#S1=177525 PS=10
                                     ;*******************************************************************************
     025724  005212                  TST260: INC     (R2)             ;UPDATE TEST NUMBER
     025726  022712  000260                  CMP     #260,(R2)        ;SEQUENCE ERROR?
     025732  001024                          BNE     TST261-10        ;BR TO ERROR HALT ON SEQ ERROR
3905 025734  012700  125252                  MOV     #125252,R0       ;LOAD R0 WITH 125252
3906 025740  012704  036502                  MOV     #S3,R4           ;SET UP R4
3907 025744  072037  036502                  ASH     @#S3,R0          ;SHIFT R0 BY @#S1
3908 025750  013767  177776  010512          MOV     @#PS,SPSW        ;SAVE PS
3909 025756  122767  000010  010504          CMPB    #10,SPSW                 ;IS THE PS 10?
3910 025764  001404                          BEQ     1$
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 762            <====
     025766  012742  000605                  MOV     #605,-(R2)       ;MOVE TO MAILBOX #  *******  605  *******
     025772  005242                          INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     025774  000000                          HALT                     ;THE PS IS NOT EQUAL TO 10
3911 025776  022700  177525          1$:     CMP     #177525,R0       ;IS THE RESULT 177525?
3912 026002  001404                          BEQ     TST261
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                      ;           CONDITIONAL BRANCH INST. AND    <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                      ;           WHICH FOLLOWS W/ 753            <====
     026004  012742  000606                  MOV     #606,-(R2)       ;MOVE TO MAILBOX #  *******  606  *******
     026010  005242                          INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     026012  000000                          HALT                     ;R0 IS NOT EQUAL TO 177525
```

```
                                                                ;  OR SEQUENCE ERROR


                                        .SBTTL ASH SHIFTING LEFT USING DM6 REG 7
                                                ;SHIFT LEFT TEST R17 TO DETERMINE C-BIT
                                                ;CLEAR BX TO INDICATE C-BIT=0
                                                ;MODE 6 /REG 7
                                  ;*******************************************************************************
                                  ;TEST 261      ASH 025252 SHIFTED S1=125250 PS=12
                                  ;*******************************************************************************
      026014  005212              TST261: INC     (R2)            ;UPDATE TEST NUMBER
      026016  022712  000261              CMP     #261,(R2)       ;SEQUENCE ERROR?
      026022  001024                      BNE     TST262-10       ;BR TO ERROR HALT ON SEQ ERROR
      026024  012700  025252              MOV     #025252,R0      ;LOAD R0 WITH 025252
      026030  012704  036476              MOV     #S1,R4          ;SET UP R4
      026034  072067  010436              ASH     S1,R0           ;SHIFT R0 BY S1
      026040  013767  177776  010422      MOV     @#PS,SPSW       ;SAVE PS
      026046  122767  000012  010414      CMPB    #12,SPSW                ;IS THE PS 10?
      026054  001404                      BEQ     1$
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                  ;           CONDITIONAL BRANCH INST. AND     <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                  ;           WHICH FOLLOWS W/ 762             <====
      026056  012742  000607              MOV     #607,-(R2)      ;MOVE TO MAILBOX #  *******  607  *******
      026062  005242                      INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      026064  000000                      HALT                    ;THE PS IS NOT EQUAL TO 10
      026066  022700  125250      1$:     CMP     #125250,R0      ;IS THE RESULT 125250
      026072  001404                      BEQ     TST262
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                  ;           CONDITIONAL BRANCH INST. AND     <====
                                                                  ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                  ;           WHICH FOLLOWS W/ 753             <====
      026074  012742  000610              MOV     #610,-(R2)      ;MOVE TO MAILBOX #  *******  610  *******
      026100  005242                      INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      026102  000000                      HALT                    ;R0 IS NOT EQUAL TO 077525
                                                                  ;  OR SEQUENCE ERROR



                                        .SBTTL ASHC SHIFTING POS.USING DM0 REG 2
                                                ;MODE 0 REG 4
                                  ;*******************************************************************************
                                  ;TEST 262      ASHC 125252,125252,SHIF BY R4=177525 52525 PS=10
                                  ;*******************************************************************************
      026104  005212              TST262: INC     (R2)            ;UPDATE TEST NUMBER
      026106  022712  000262              CMP     #262,(R2)       ;SEQUENCE ERROR?
      026112  001035                      BNE     TST263-10       ;BR TO ERROR HALT ON SEQ ERROR
      026114  012700  125252              MOV     #125252 ,R0     ;LOAD R0 WITH 125252
      026120  012701  125252              MOV     #125252,R1      ;LOAD R0!1 WITH 125252
      026124  000241                      CLC
      026126  012704  177771              MOV     #-7,R4          ;SET UP R4
      026132  073004                      ASHC    R4,R0           ;SHIFT R0,R0!1 BY R4
      026134  013767  177776  010326      MOV     @#PS,SPSW       ;SAVE PS
      026142  122767  000010  010320      CMPB    #10,SPSW                ;IS THE PS 10?
      026150  001404                      BEQ     1$
                                                                  ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                  ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;               REPLACE THE MOVE INSTRUCTION   <====
                                                                ;               WHICH FOLLOWS W/ 760           <====
     026152  012742  000611                  MOV     #611,-(R2)     ;MOVE TO MAILBOX #  *******  611  *******
     026156  005242                          INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     026160  000000                          HALT                   ;THE PS IS NOT EQUAL TO 10
     026162  022700  177525          1$:     CMP     #177525,R0     ;IS RESULT 177525?
     026166  001404                          BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                ;               CONDITIONAL BRANCH INST. AND   <====
                                                                ;               REPLACE THE MOVE INSTRUCTION   <====
                                                                ;               WHICH FOLLOWS W/ 751           <====
     026170  012742  000612                  MOV     #612,-(R2)     ;MOVE TO MAILBOX #  *******  612  *******
     026174  005242                          INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     026176  000000                          HALT                   ;R0 IS NOT EQUAL TO 177525
     026200  022701  052525          2$:     CMP     #52525,R1      ;IS THE RESULT 52525?
     026204  001404                          BEQ     TST263
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                ;               CONDITIONAL BRANCH INST. AND   <====
                                                                ;               REPLACE THE MOVE INSTRUCTION   <====
                                                                ;               WHICH FOLLOWS W/ 742           <====
     026206  012742  000613                  MOV     #613,-(R2)     ;MOVE TO MAILBOX #  *******  613  *******
     026212  005242                          INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     026214  000000                          HALT                   ;R1 IS NOT EQUAL TO 52525
                                                                ;  OR SEQUENCE ERROR
                                             .SBTTL ASHC SHIFTING NEG. USING DM4 REG 3

                                                     ;MODE 4 REG 3
                                     ;*******************************************************************************************
                                     ;TEST 263        ASHC 125252,125252,SHIF,-(3)=177525,52525 PS=10
                                     ;*******************************************************************************************
     026216  005212                  TST263: INC     (R2)           ;UPDATE TEST NUMBER
     026220  022712  000263                  CMP     #263,(R2)      ;SEQUENCE ERROR?
     026224  001035                          BNE     TST264-10      ;BR TO ERROR HALT ON SEQ ERROR
     026226  012700  125252                  MOV     #125252,R0     ;LOAD R0 WITH 125252
     026232  012701  125252                  MOV     #125252,R1     ;LOAD R0!1 WITH 125252
     026236  000241                          CLC
     026240  012703  036504                  MOV     #S3+2,R3       ;SET UP R3
     026244  073043                          ASHC    -(R3),R0               ;SHIFT R0,R0!1 BY -(3)
     026246  013767  177776  010214          MOV     @#PS,SPSW      ;SAVE PS
     026254  122767  000010  010206          CMPB    #10,SPSW               ;IS THE PS 10?
     026262  001404                          BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                ;               CONDITIONAL BRANCH INST. AND   <====
                                                                ;               REPLACE THE MOVE INSTRUCTION   <====
                                                                ;               WHICH FOLLOWS W/ 760           <====
     026264  012742  000614                  MOV     #614,-(R2)     ;MOVE TO MAILBOX #  *******  614  *******
     026270  005242                          INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     026272  000000                          HALT                   ;THE PS IS NOT EQUAL TO 10
     026274  022700  177525          1$:     CMP     #177525,R0     ;IS THE RESULT 177525
     026300  001404                          BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                ;               CONDITIONAL BRANCH INST. AND   <====
                                                                ;               REPLACE THE MOVE INSTRUCTION   <====
                                                                ;               WHICH FOLLOWS W/ 751           <====
     026302  012742  000615                  MOV     #615,-(R2)     ;MOVE TO MAILBOX #  *******  615  *******
     026306  005242                          INC     -(R2)          ;SET MSGTYP TO FATAL ERROR
     026310  000000                          HALT                   ;R0 IS NOT EQUAL TO 177252
```

```
   3960 026312  022701  052525              2$:     CMP     #52525,R1       ;IS THE RESULT 52525?
   3961 026316  001404                              BEQ     TST264
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 742            <====
        026320  012742  000616                      MOV     #616,-(R2)      ;MOVE TO MAILBOX #  *******  616  *******
        026324  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        026326  000000                              HALT                    ;R0!1 IS NOT EQUAL TO 52525
                                                                            ;  OR SEQUENCE ERROR
   3962
   3963                                             .SBTTL ASHC SHIFTED BY @-(4) DM5 REG 4
   3964                                                     ;MODE 5 REG 4
   3965                                     ;*******************************************************************************
                                            ;TEST 264               ASHC 125252 SHIFTED BY @-(4)=177525 52525 PS=10
                                            ;*******************************************************************************
        026330  005212                      TST264: INC     (R2)            ;UPDATE TEST NUMBER
        026332  022712  000264                      CMP     #264,(R2)       ;SEQUENCE ERROR?
        026336  001035                              BNE     TST265-10       ;BR TO ERROR HALT ON SEQ ERROR
   3966 026340  012700  125252                      MOV     #125252,R0      ;LOAD R0 WITH 125252
   3967 026344  012701  125252                      MOV     #125252,R1      ;LOAD R0!1 WITH 125252
   3968 026350  000241                              CLC
   3969 026352  012704  036506                      MOV     #S4+2,R4                ;SET UP R4
   3970 026356  073054                              ASHC    @-(R4),R0       ;SHIFT R0,!1 BY @-(4)
   3971 026360  013767  177776  010102              MOV     @#PS,SPSW       ;SAVE PS
   3972 026366  122767  000010  010074              CMPB    #10,SPSW                ;IS THE PS 10?
   3973 026374  001404                              BEQ     1$
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 760            <====
        026376  012742  000617                      MOV     #617,-(R2)      ;MOVE TO MAILBOX #  *******  617  *******
        026402  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        026404  000000                              HALT                    ;THE PS IS NOT EQUAL TO 10
   3974 026406  022700  177525              1$:     CMP     #177525,R0      ;IS THE RESULT 177525?
   3975 026412  001404                              BEQ     2$
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 751            <====
        026414  012742  000620                      MOV     #620,-(R2)      ;MOVE TO MAILBOX #  *******  620  *******
        026420  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        026422  000000                              HALT                    ;R0 IS NOT EQUAL TO 177525
   3976 026424  022701  052525              2$:     CMP     #52525,R1       ;IS THE RESULT 52525?
   3977 026430  001404                              BEQ     TST265
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 742            <====
        026432  012742  000621                      MOV     #621,-(R2)      ;MOVE TO MAILBOX #  *******  621  *******
        026436  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        026440  000000                              HALT                    ;R0!1 IS NOT EQUAL TO 52525
                                                                            ;  OR SEQUENCE ERROR
   3978
   3979                                             .SBTTL ASHC SHIFTED BY @(4) DM7 REG 4
   3980                                                     ;MODE 7 REG 4
   3981                                     ;*******************************************************************************
```

```
                                              ;TEST 265        ASHC 1252552,125252,SHIF,@(4)=177525,52525 PS=10
                                              ;*******************************************************************************
      026442  005212                          TST265: INC      (R2)             ;UPDATE TEST NUMBER
      026444  022712  000265                          CMP      #265,(R2)        ;SEQUENCE ERROR?
      026450  001036                                  BNE      TST266-10        ;BR TO ERROR HALT ON SEQ ERROR
      026452  012700  125252                          MOV      #125252,R0       ;LOAD R0 WITH 125252
      026456  012701  125252                          MOV      #125252,R1       ;LOAD R0!1 WITH 125252
      026462  000241                                  CLC
      026464  012704  036504                          MOV      #S4,R4           ;SET UP R4
      026470  073074  000000                          ASHC     @(R4),R0               ;SHIFT R0,R0!1 BY @(4)
      026474  013767  177776  007766                  MOV      @#PS,SPSW        ;SAVE PS
      026502  122767  000010  007760                  CMPB     #10,SPSW               ;IS THE PS 10?
      026510  001404                                  BEQ      1$
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                                ;           WHICH FOLLOWS W/ 757           <====
      026512  012742  000622                          MOV      #622,-(R2)       ;MOVE TO MAILBOX #  *******  622  *******
      026516  005242                                  INC      -(R2)            ;SET MSGTYP TO FATAL ERROR
      026520  000000                                  HALT                      ;THE PS IS NOT EQUAL TO 10
      026522  022700  177525                  1$:     CMP      #177525,R0       ;IS THE RESULT 177525?
      026526  001404                                  BEQ      2$
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                                ;           WHICH FOLLOWS W/ 750           <====
      026530  012742  000623                          MOV      #623,-(R2)       ;MOVE TO MAILBOX #  *******  623  *******
      026534  005242                                  INC      -(R2)            ;SET MSGTYP TO FATAL ERROR
      026536  000000                                  HALT                      ;R0 IS NOT EQUAL TO 177525
      026540  022701  052525                  2$:     CMP      #52525,R1        ;IS THE RESULT 52525?
      026544  001404                                  BEQ      TST266
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                                ;           WHICH FOLLOWS W/ 741           <====
      026546  012742  000624                          MOV      #624,-(R2)       ;MOVE TO MAILBOX #  *******  624  *******
      026552  005242                                  INC      -(R2)            ;SET MSGTYP TO FATAL ERROR
      026554  000000                                  HALT                      ;R0!1 IS NOT EQUAL TO 52525
                                                                                ;  OR SEQUENCE ERROR

                                                      .SBTTL ASHC SHIFTED BY -32. DM2 REG 7
                                                                ;MODE 2 REG 7
                                              ;*******************************************************************************
                                              ;TEST 266        ASHC 100000 0 SHIFTED BY -32.=-1 -1 PS=11
                                              ;*******************************************************************************
      026556  005212                          TST266: INC      (R2)             ;UPDATE TEST NUMBER
      026560  022712  000266                          CMP      #266,(R2)        ;SEQUENCE ERROR?
      026564  001034                                  BNE      TST267-10        ;BR TO ERROR HALT ON SEQ ERROR
      026566  012700  100000                          MOV      #100000,R0       ;LOAD R0 WITH 100000
      026572  012701  000000                          MOV      #0,R1            ;LOAD R0!1 WITH 0
      026576  000241                                  CLC
      026600  073027  177740                          ASHC     #-32.,R0         ;SHIFT R0,R0!1 BY -32.
      026604  013767  177776  007656                  MOV      @#PS,SPSW        ;SAVE PS
      026612  122767  000011  007650                  CMPB     #11,SPSW               ;IS THE PS 11?
      026620  001404                                  BEQ      1$
                                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                             ;              REPLACE THE MOVE INSTRUCTION    <====
                                                             ;              WHICH FOLLOWS W/ 761            <====
026622  012742  000625                  MOV     #625,-(R2)   ;MOVE TO MAILBOX #  *******  625  *******
026626  005242                          INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
026630  000000                          HALT                 ;THE PS IS NOT EQUAL TO 11
026632  022700  177777          1$:     CMP     #-1,R0       ;IS THE RESULT -1?
026636  001404                          BEQ     2$
                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                             ;              CONDITIONAL BRANCH INST. AND    <====
                                                             ;              REPLACE THE MOVE INSTRUCTION    <====
                                                             ;              WHICH FOLLOWS W/ 752            <====
026640  012742  000626                  MOV     #626,-(R2)   ;MOVE TO MAILBOX #  *******  626  *******
026644  005242                          INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
026646  000000                          HALT                 ;RO IS NOT EQUAL TO -1
026650  022701  177777          2$:     CMP     #-1,R1  ;IS THE RESULT -1?
026654  001404                          BEQ     TST267
                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                             ;              CONDITIONAL BRANCH INST. AND    <====
                                                             ;              REPLACE THE MOVE INSTRUCTION    <====
                                                             ;              WHICH FOLLOWS W/ 743            <====
026656  012742  000627                  MOV     #627,-(R2)   ;MOVE TO MAILBOX #  *******  627  *******
026662  005242                          INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
026664  000000                          HALT                 ;RO!1 IS NOT EQUAL TO -1
                                                             ;  OR SEQUENCE ERROR

                                        .SBTTL ASHC SHIFTED BY 15 DM2 REG 7
                                                ;MODE 2 REG 7
                                ;***********************************************************************************
                                ;TEST 267       ASHC 0 -1 SHIFTED BY 15.=77777 100000 PS=0
                                ;***********************************************************************************
026666  005212                  TST267: INC     (R2)         ;UPDATE TEST NUMBER
026670  022712  000267                  CMP     #267,(R2)    ;SEQUENCE ERROR?
026674  001034                          BNE     TST270-10    ;BR TO ERROR HALT ON SEQ ERROR
026676  012700  000000                  MOV     #0,R0        ;LOAD RO WITH 0
026702  012701  177777                  MOV     #-1,R1  ;LOAD RO!1 WITH -1
026706  000241                          CLC
026710  073027  000017                  ASHC    #15.,R0      ;SHIFT RO,RO!1 BY 15.
026714  013767  177776  007546          MOV     @#PS,SPSW    ;SAVE PS
026722  122767  000000  007540          CMPB    #0,SPSW      ;IS THE PS 0?
026730  001404                          BEQ     1$
                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                             ;              CONDITIONAL BRANCH INST. AND    <====
                                                             ;              REPLACE THE MOVE INSTRUCTION    <====
                                                             ;              WHICH FOLLOWS W/ 761            <====
026732  012742  000630                  MOV     #630,-(R2)   ;MOVE TO MAILBOX #  *******  630  *******
026736  005242                          INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
026740  000000                          HALT                 ;THE PS IS NOT EQUAL TO 0
026742  022700  077777          1$:     CMP     #77777,R0    ;IS THE RESULT 77777?
026746  001404                          BEQ     2$
                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                             ;              CONDITIONAL BRANCH INST. AND    <====
                                                             ;              REPLACE THE MOVE INSTRUCTION    <====
                                                             ;              WHICH FOLLOWS W/ 752            <====
026750  012742  000631                  MOV     #631,-(R2)   ;MOVE TO MAILBOX #  *******  631  *******
026754  005242                          INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
026756  000000                          HALT                 ;RO IS NOT EQUAL TO 77777
026760  022701  100000          2$:     CMP     #100000,R1   ;IS THE RESULT 100000?
```

```
  4023 026764  001404                              BEQ     TST270
                                                                           ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                           ;           CONDITIONAL BRANCH INST. AND    <====
                                                                           ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                           ;           WHICH FOLLOWS W/ 743            <====
       026766  012742  000632                      MOV     #632,-(R2)      ;MOVE TO MAILBOX #  *******  632  *******
       026772  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       026774  000000                              HALT                    ;R0!1 IS NOT EQUAL TO 100000
                                                                           ;  OR SEQUENCE ERROR
  4024
  4025                                             .SBTTL ASHC SHIFTED BY 16. DM2 REG 7
  4026                                                     ;MODE 2 REG 7
  4027                                     ;*******************************************************************************
                                           ;TEST 270       ASHC 0 52525 SHIFTED BY 16.=52525 0 PS=0
                                           ;*******************************************************************************
       026776  005212                      TST270: INC     (R2)            ;UPDATE TEST NUMBER
       027000  022712  000270                      CMP     #270,(R2)       ;SEQUENCE ERROR?
       027004  001034                              BNE     TST271-10       ;BR TO ERROR HALT ON SEQ ERROR
  4028 027006  012700  000000                      MOV     #0,R0           ;LOAD R0 WITH 0
  4029 027012  012701  052525                      MOV     #52525,R1       ;LOAD R0!1 WITH 52525
  4030 027016  000241                              CLC
  4031 027020  073027  000020                      ASHC    #16.,R0         ;SHIFT R0,R0!1 BY 16.
  4032 027024  013767  177776  007436              MOV     @#PS,SPSW       ;SAVE PS
  4033 027032  122767  000000  007430              CMPB    #0,SPSW         ;IS THE PS 0?
  4034 027040  001404                              BEQ     1$
                                                                           ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                           ;           CONDITIONAL BRANCH INST. AND    <====
                                                                           ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                           ;           WHICH FOLLOWS W/ 761            <====
       027042  012742  000633                      MOV     #633,-(R2)      ;MOVE TO MAILBOX #  *******  633  *******
       027046  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       027050  000000                              HALT                    ;THE PS IS NOT EQUAL TO 0
  4035 027052  022700  052525              1$:     CMP     #52525,R0       ;IS THE RESULT 52525?
  4036 027056  001404                              BEQ     2$
                                                                           ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                           ;           CONDITIONAL BRANCH INST. AND    <====
                                                                           ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                           ;           WHICH FOLLOWS W/ 752            <====
       027060  012742  000634                      MOV     #634,-(R2)      ;MOVE TO MAILBOX #  *******  634  *******
       027064  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       027066  000000                              HALT                    ;R0 IS NOT EQUAL TO 52525
  4037 027070  022701  000000              2$:     CMP     #0,R1           ;IS THE RESULT 0?
  4038 027074  001404                              BEQ     TST271
                                                                           ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                           ;           CONDITIONAL BRANCH INST. AND    <====
                                                                           ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                           ;           WHICH FOLLOWS W/ 743            <====
       027076  012742  000635                      MOV     #635,-(R2)      ;MOVE TO MAILBOX #  *******  635  *******
       027102  005242                              INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       027104  000000                              HALT                    ;R0!1 IS NOT EQUAL TO 0
                                                                           ;  OR SEQUENCE ERROR
  4039
  4040                                                     ;MODE 2 REG 7
```

```
 4042                                   ;*****************************************************************************
                                        ;TEST 271         ASHC -1 0 SHIFTED BY 16. =0 0 PS=7
                                        ;*****************************************************************************
      027106  005212                    TST271: INC     (R2)            ;UPDATE TEST NUMBER
      027110  022712  000271                    CMP     #271,(R2)       ;SEQUENCE ERROR?
      027114  001034                            BNE     TST272-10       ;BR TO ERROR HALT ON SEQ ERROR
 4043 027116  012700  177777                    MOV     #-1,R0          ;LOAD R0 WITH -1
 4044 027122  012701  000000                    MOV     #0,R1           ;LOAD R0!1 WITH 0
 4045 027126  000241                            CLC
 4046 027130  073027  000020                    ASHC    #16.,R0         ;SHIFT R0,R0!1 BY 16.
 4047 027134  013767  177776  007326            MOV     @#PS,SPSW       ;SAVE PS
 4048 027142  122767  000007  007320            CMPB    #7,SPSW         ;IS THE PS 7?
 4049 027150  001404                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 761            <====
      027152  012742  000636                    MOV     #636,-(R2)      ;MOVE TO MAILBOX #  *******  636  *******
      027156  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      027160  000000                            HALT                    ;THE PS IS NOT EQUAL TO 7
 4050 027162  022700  000000            1$:     CMP     #0,R0           ;IS THE RESULT 0?
 4051 027166  001404                            BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 752            <====
      027170  012742  000637                    MOV     #637,-(R2)      ;MOVE TO MAILBOX #  *******  637  *******
      027174  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      027176  000000                            HALT                    ;R0 IS NOT EQUAL TO 0
 4052 027200  022701  000000            2$:     CMP     #0,R1           ;IS THE RESULT 0?
 4053 027204  001404                            BEQ     TST272
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 743            <====
      027206  012742  000640                    MOV     #640,-(R2)      ;MOVE TO MAILBOX #  *******  640  *******
      027212  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      027214  000000                            HALT                    ;R0!1 IS NOT EQUAL TO 0
                                                                        ;  OR SEQUENCE ERROR
 4054
 4055                                           .SBTTL ASHC SHIFTED BY @(4) DM7 REG 4
 4056                                                   ;MODE 7 REG 4
 4057                                   ;*****************************************************************************
                                        ;TEST 272         ASHC 125252,125252,SHIF,@(4)=177525,52525 PS=10
                                        ;*****************************************************************************
      027216  005212                    TST272: INC     (R2)            ;UPDATE TEST NUMBER
      027220  022712  000272                    CMP     #272,(R2)       ;SEQUENCE ERROR?
      027224  001036                            BNE     TST273-10       ;BR TO ERROR HALT ON SEQ ERROR
 4058 027226  012701  125252                    MOV     #125252,R1      ;LOAD R0!1 WITH 125252
 4059 027232  012700  125252                    MOV     #125252,R0      ;LOAD R0 WITH 125252
 4060 027236  000241                            CLC
 4061 027240  012704  036504                    MOV     #S4,R4          ;SET UP R4
 4062 027244  073074  000000                    ASHC    @(R4),R0                ;SHIFT R0,R0!1 BY @(4)
 4063 027250  013767  177776  007212            MOV     @#PS,SPSW       ;SAVE PS
 4064 027256  122767  000010  007204            CMPB    #10,SPSW                ;IS THE PS 10?
 4065 027264  001404                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;               CONDITIONAL BRANCH INST. AND     <====
                                                                    ;               REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;               WHICH FOLLOWS W/ 757             <====
        027266  012742  000641                  MOV     #641,-(R2)  ;MOVE TO MAILBOX #  *******  641   *******
        027272  005242                          INC     -(R2)       ;SET MSGTYP TO FATAL ERROR
        027274  000000                          HALT                ;THE PS IS NOT EQUAL TO 10
   4066 027276  022701  052525          1$:     CMP     #52525,R1   ;IS THE RESULT 52525?
   4067 027302  001404                          BEQ     2$
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;               CONDITIONAL BRANCH INST. AND     <====
                                                                    ;               REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;               WHICH FOLLOWS W/ 750             <====
        027304  012742  000642                  MOV     #642,-(R2)  ;MOVE TO MAILBOX #  *******  642   *******
        027310  005242                          INC     -(R2)       ;SET MSGTYP TO FATAL ERROR
        027312  000000                          HALT                ;R0!1 IS NOT EQUAL TO 52525
   4068 027314  022700  177525          2$:     CMP     #177525,R0  ;IS THE RESULT 177525?
   4069 027320  001404                          BEQ     TST273
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                    ;               CONDITIONAL BRANCH INST. AND     <====
                                                                    ;               REPLACE THE MOVE INSTRUCTION     <====
                                                                    ;               WHICH FOLLOWS W/ 741             <====
        027322  012742  000643                  MOV     #643,-(R2)  ;MOVE TO MAILBOX #  *******  643   *******
        027326  005242                          INC     -(R2)       ;SET MSGTYP TO FATAL ERROR
        027330  000000                          HALT                ;R0 IS NOT EQUAL TO 177525
                                                                    ;  OR SEQUENCE ERROR
   4070
   4071
```

```
                                                        .SBTTL MUL USING DM2 REG 7
                                        ;*****************************************************************************
                                        ;TEST 273          MUL  100000 * #100000 = 40000 0  PS=1
                                        ;*****************************************************************************
     027332  005212                     TST273: INC     (R2)            ;UPDATE TEST NUMBER
     027334  022712  000273                     CMP     #273,(R2)       ;SEQUENCE ERROR?
     027340  001035                             BNE     TST274-10       ;BR TO ERROR HALT ON SEQ ERROR
     027342  012706  001000                     MOV     #STBOT,R6
     027346  005037  177776                     CLR     @#PS
     027352  012700  100000                     MOV     #100000,R0      ;LOAD MULTIPLICAN WITH 100000
     027356  070027  100000                     MUL     #100000,R0      ;MULTIPLY 100000 BY #100000
     027362  013767  177776  007100             MOV     @#PS,SPSW       ;SAVE PS
     027370  122767  000001  007072             CMPB    #1,SPSW         ;IS PS = 1
     027376  001404                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 760            <====
     027400  012742  000644                     MOV     #644,-(R2)      ;MOVE TO MAILBOX #  *******  644   *******
     027404  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     027406  000000                             HALT                    ;PS IS WRONG
     027410  022700  040000             1$:     CMP     #40000,R0       ;IS HIGH ORDER = 40000
     027414  001404                             BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOI LOWS W/ 751           <====
     027416  012742  000645                     MOV     #645,-(R2)      ;MOVE TO MAILBOX #    *****  645   *******
     027422  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     027424  000000                             HALT                    ;HIGH ORDER IS WRONG
     027426  022701  000000             2$:     CMP     #0,R1           ;IS LOWER = 0
     027432  001404                             BEQ     TST274
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 742            <====
     027434  012742  000646                     MOV     #646,-(R2)      ;MOVE TO MAILBOX #  *******  646   *******
     027440  005242                             INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     027442  000000                             HALT                    ;LOW ORDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR

                                                        ;TEST MSB OF LOWER PRODUCT CLEAR C-BIT
                                                        ;MODE 2 /REG7

                                        ;*****************************************************************************
                                        ;TEST 274          MUL  70707 * #70707 = 31221 44261  PS=1
                                        ;*****************************************************************************
     027444  005212                     TST274: INC     (R2)            ;UPDATE TEST NUMBER
     027446  022712  000274                     CMP     #274,(R2)       ;SEQUENCE ERROR?
     027452  001031                             BNE     TST275-10       ;BR TO ERROR HALT ON SEQ ERROR
     027454  012700  070707                     MOV     #70707,R0       ;LOAD MULTIPLICAN WITH 70707
     027460  070027  070707                     MUL     #70707,R0       ;MULTIPLY 70707 BY #70707
     027464  013767  177776  006776             MOV     @#PS,SPSW       ;SAVE PS = 1
     027472  122767  000001  006770             CMPB    #1,SPSW         ;IS PS = 1
     027500  001404                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                 ;                WHICH FOLLOWS W/ 764          <====
     027502  012742  000647                  MOV     #647,-(R2)          ;MOVE TO MAILBOX #  *******  647  *******
     027506  005242                          INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     027510  000000                          HALT                        ;PS IS WRONG
     027512  022700  031221          1$:     CMP     #31221,R0           ;IS HIGH ORDER =31221
     027516  001404                          BEQ     2$
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                 ;           CONDITIONAL BRANCH INST. AND        <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION        <====
                                                                 ;           WHICH FOLLOWS W/ 755                <====
     027520  012742  000650                  MOV     #650,-(R2)          ;MOVE TO MAILBOX #  *******  650  *******
     027524  005242                          INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     027526  000000                          HALT                        ;HIGH ORDER IS WRONG
     027530  022701  044261          2$:     CMP     #44261,R1           ;IS LOWER ORDER =44261
     027534  001404                          BEQ     TST275
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                 ;           CONDITIONAL BRANCH INST. AND        <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION        <====
                                                                 ;           WHICH FOLLOWS W/ 746                <====
     027536  012742  000651                  MOV     #651,-(R2)          ;MOVE TO MAILBOX #  *******  651  *******
     027542  005242                          INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     027544  000000                          HALT                        ;LOW ORDER IS WRONG
                                                                 ;  OR SEQUENCE ERROR

                                                     ;STORE UPPER PRODUCT AND SET C-BIT NEG #
                                                     ;MODE 2 /REG 7
                                     ;*******************************************************************************
                                     ;TEST 275          MUL  107070 * #107070 = 31222 26100 PS=1
                                     ;*******************************************************************************
     027546  005212                  TST275: INC     (R2)                ;UPDATE TEST NUMBER
     027550  022712  000275                  CMP     #275,(R2)           ;SEQUENCE ERROR?
     027554  001031                          BNE     TST276-10           ;BR TO ERROR HALT ON SEQ ERROR
     027556  012700  107070                  MOV     #107070,R0          ;LOAD MULTIPLICAN WITH 107070
     027562  070027  107070                  MUL     #107070,R0          ;MULTIPLY 107070 BY #107070
     027566  013767  177776  006674          MOV     @#PS,SPSW           ;SAVE PS
     027574  122767  000001  006666          CMPB    #1,SPSW             ;IS PS = 1
     027602  001404                          BEQ     1$
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                 ;           CONDITIONAL BRANCH INST. AND        <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION        <====
                                                                 ;           WHICH FOLLOWS W/ 764                <====
     027604  012742  000652                  MOV     #652,-(R2)          ;MOVE TO MAILBOX #  *******  652  *******
     027610  005242                          INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     027612  000000                          HALT                        ;PS IS WRONG
     027614  022700  031222          1$:     CMP     #31222,R0           ;IS HIGH ORDER = 31222
     027620  001404                          BEQ     2$
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                 ;           CONDITIONAL BRANCH INST. AND        <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION        <====
                                                                 ;           WHICH FOLLOWS W/ 755                <====
     027622  012742  000653                  MOV     #653,-(R2)          ;MOVE TO MAILBOX #  *******  653  *******
     027626  005242                          INC     -(R2)               ;SET MSGTYP TO FATAL ERROR
     027630  000000                          HALT                        ;
     027632  022701  026100          2$:     CMP     #26100,R1           ;IS LOW ORDER = 26100
     027636  001404                          BEQ     TST276
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                 ;           CONDITIONAL BRANCH INST. AND        <====
                                                                          ;               REPLACE THE MOVE INSTRUCTION    <====
                                                                          ;               WHICH FOLLOWS W/ 746            <====
     027640  012742  000654                         MOV      #654,-(R2)   ;MOVE TO MAILBOX #  *******  654  *******
     027644  005242                                 INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
     027646  000000                                 HALT                  ;LOW ORDER IS WRONG
                                                                          ;  OR SEQUENCE ERROR
                                                             ;PUT MULTIPLER IN R12 AND TEST SIGN FOR ZERO
                                                             ;MODE 2 /REG 7
                                                  ;**************************************************************************
                                                  ;TEST 276          MUL  77777 * #100000 = 140000 100000 PS=11
                                                  ;**************************************************************************
     027650  005212                               TST276: INC      (R2)         ;UPDATE TEST NUMBER
     027652  022712  000276                               CMP      #276,(R2)    ;SEQUENCE ERROR?
     027656  001031                                       BNE      TST277-10    ;BR TO ERROR HALT ON SEQ ERROR
     027660  012700  077777                               MOV      #77777,R0    ;LOAD MULTIPLICAN WITH 77777
     027664  070027  100000                               MUL      #100000,R0   ;MULTIPLY 77777 BY #100000
     027670  013767  177776  006572                       MOV      @#PS,SPSW    ;SAVE PS
     027676  122767  000011  006564                       CMPB     #11,SPSW             ;IS PS = 11
     027704  001404                                       BEQ      1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 764             <====
     027706  012742  000655                               MOV      #655,-(R2)   ;MOVE TO MAILBOX #  *******  655  *******
     027712  005242                                       INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
     027714  000000                                       HALT                  ;PS IS WRONG
     027716  022700  140000                       1$:     CMP      #140000,R0   ;IS HIGH ORDER = 140000
     027722  001404                                       BEQ      2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 755             <====
     027724  012742  000656                               MOV      #656,-(R2)   ;MOVE TO MAILBOX #  *******  656  *******
     027730  005242                                       INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
     027732  000000                                       HALT                  ;HIGH ORDER IS WRONG
     027734  022701  100000                       2$:     CMP      #100000,R1   ;IS LOW ORDER = 100000
     027740  001404                                       BEQ      TST277
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 746             <====
     027742  012742  000657                               MOV      #657,-(R2)   ;MOVE TO MAILBOX #  *******  657  *******
     027746  005242                                       INC      -(R2)        ;SET MSGTYP TO FATAL ERROR
     027750  000000                                       HALT                  ;LOW ORDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR

                                                             ;SET Z-BIT R17 = 0
                                                             ;MODE 2 /REG 7
                                                  ;**************************************************************************
                                                  ;TEST 277          MUL  -1 * #0 = 0 0  PS=4
                                                  ;**************************************************************************
     027752  005212                               TST277: INC      (R2)         ;UPDATE TEST NUMBER
     027754  022712  000277                               CMP      #277,(R2)    ;SEQUENCE ERROR?
     027760  001031                                       BNE      TST300-10    ;BR TO ERROR HALT ON SEQ ERROR
     027762  012700  177777                               MOV      #-1,R0       ;LOAD MULTIPLICAN WITH -1
     027766  070027  000000                               MUL      #0,R0        ;MULTIPLY -1 BY #0
     027772  013767  177776  006470                       MOV      @#PS,SPSW    ;SAVE PS
```

```
030000  122767  000004  006462          CMPB    #4,SPSW         ;IS PS = 4
030006  001404                          BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 764             <====
030010  012742  000660                  MOV     #660,-(R2)      ;MOVE TO MAILBOX #  *******  660  *******
030014  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
030016  000000                          HALT                    ;PS IS WRONG
030020  022700  000000          1$:     CMP     #0,R0           ;IS HIGH ORDER = 0
030024  001404                          BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 755             <====
030026  012742  000661                  MOV     #661,-(R2)      ;MOVE TO MAILBOX #  *******  661  *******
030032  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
030034  000000                          HALT                    ;HIGH ORDER IS WRONG
030036  022701  000000          2$:     CMP     #0,R1           ;IS LOW ORDER = 0
030042  001404                          BEQ     TST300
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 746             <====
030044  012742  000662                  MOV     #662,-(R2)      ;MOVE TO MAILBOX #  *******  662  *******
030050  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
030052  000000                          HALT                    ;LOW ORDER IS WRONG
                                                                ;  OR SEQUENCE ERROR

                                                ;TEST UPPER PRODUCT FOR ALL ONES,CLEAR C-BIT
                                                ;MODE 2 /REG 7
                                ;*****************************************************************************
                                ;TEST 300           MUL  -1 * #77777 = 100001 100001  PS=10
                                ;*****************************************************************************
030054  005212                  TST300: INC     (R2)            ;UPDATE TEST NUMBER
030056  022712  000300                  CMP     #300,(R2)       ;SEQUENCE ERROR?
030062  001031                          BNE     TST301-10       ;BR TO ERROR HALT ON SEQ ERROR
030064  012701  177777                  MOV     #-1,R1          ;LOAD MULTIPLICAN WITH -1
030070  070127  077777                  MUL     #77777,R1       ;MULTIPLY -1 BY #77777
030074  013767  177776  006366          MOV     @#PS,SPSW       ;SAVE PS
030102  122767  000010  006360          CMPB    #10,SPSW                ;IS PS = 10
030110  001404                          BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 764             <====
030112  012742  000663                  MOV     #663,-(R2)      ;MOVE TO MAILBOX #  *******  663  *******
030116  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
030120  000000                          HALT                    ;PS IS WRONG
030122  022701  100001          1$:     CMP     #100001,R1      ;IS HIGH ORDER = 100001
030126  001404                          BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                ;           CONDITIONAL BRANCH INST. AND     <====
                                                                ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                ;           WHICH FOLLOWS W/ 755             <====
030130  012742  000664                  MOV     #664,-(R2)      ;MOVE TO MAILBOX #  *******  664  *******
030134  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
```

```
 030136  000000                          HALT                       ;HIGHT ORDER IS WRONG
 030140  022701  100001          2$:     CMP     #100001,R1         ;IS LOW ORDER = 100001
 030144  001404                          BEQ     TST301
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 746            <====
 030146  012742  000665                  MOV     #665,-(R2)         ;MOVE TO MAILBOX #  *******  665  *******
 030152  005242                          INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
 030154  000000                          HALT                       ;LOW ORDER IS WRONG
                                                                    ;  OR SEQUENCE ERROR
                                                 ;MODE 2 /REG 7
                                 ;*******************************************************************************
                                 ;TEST 301       MUL 2 * #2 = 0 4 PS=0
                                 ;*******************************************************************************
 030156  005212                  TST301: INC     (R2)               ;UPDATE TEST NUMBER
 030160  022712  000301                  CMP     #301,(R2)          ;SEQUENCE ERROR?
 030164  001031                          BNE     TST302-10          ;BR TO ERROR HALT ON SEQ ERROR
 030166  012700  000002                  MOV     #2,R0              ;LOAD MULTIPLICAN WITH 2
 030172  070027  000002                  MUL     #2,R0              ;MULTIPLY 2 BY #2
 030176  013767  177776  006264          MOV     @#PS,SPSW          ;SAVE PS
 030204  122767  000000  006256          CMPB    #0,SPSW            ;IS PS=0
 030212  001404                          BEQ     1$
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 764            <====
 030214  012742  000666                  MOV     #666,-(R2)         ;MOVE TO MAILBOX #  *******  666  *******
 030220  005242                          INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
 030222  000000                          HALT                       ;PS IS WRONG
 030224  022700  000000          1$:     CMP     #0,R0              ;IS HIGH ORDER =0
 030230  001404                          BEQ     2$
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 755            <====
 030232  012742  000667                  MOV     #667,-(R2)         ;MOVE TO MAILBOX #  *******  667  *******
 030236  005242                          INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
 030240  000000                          HALT                       ;HIGH ORDER IS WRONG
 030242  022701  000004          2$:     CMP     #4,R1              ;IS LOW ORDER =4
 030246  001404                          BEQ     TST302
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                    ;           CONDITIONAL BRANCH INST. AND    <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                    ;           WHICH FOLLOWS W/ 746            <====
 030250  012742  000670                  MOV     #670,-(R2)         ;MOVE TO MAILBOX #  *******  670  *******
 030254  005242                          INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
 030256  000000                          HALT                       ;LOW ORDER IS WRONG
                                                                    ;  OR SEQUENCE ERROR

                                                 ;MODE 2 /REG 7
                                 ;*******************************************************************************
                                 ;TEST 302       MUL 1 * #-1 = -1 -1 PS=10
                                 ;*******************************************************************************
 030260  005212                  TST302: INC     (R2)               ;UPDATE TEST NUMBER
 030262  022712  000302                  CMP     #302,(R2)          ;SEQUENCE ERROR?
 030266  001031                          BNE     TST303-10          ;BR TO ERROR HALT ON SEQ ERROR
```

```
   4164 030270  012700  000001                  MOV     #1,R0           ;LOAD MULTIPLICAN WITH 1
   4165 030274  070027  177777                  MUL     #-1,R0  ;MULTIPLY 1 BY #-1
   4166 030300  013767  177776  006162          MOV     @#PS,SPSW       ;SAVE PS
   4167 030306  122767  000010  006154          CMPB    #10,SPSW                ;IS PS =10
   4168 030314  001404                          BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 764             <====
        030316  012742  000671                  MOV     #671,-(R2)      ;MOVE TO MAILBOX #  *******  671  *******
        030322  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        030324  000000                          HALT                    ;PS IS WRONG
   4169 030326  022700  177777          1$:     CMP     #-1,R0          ;IS HIGH ORDER =-1
   4170 030332  001404                          BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 755             <====
        030334  012742  000672                  MOV     #672,-(R2)      ;MOVE TO MAILBOX #  *******  672  *******
        030340  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        030342  000000                          HALT                    ;HIGH ORDER IS WRONG
   4171 030344  022701  177777          2$:     CMP     #-1,R1  ;IS LOW ORDER =-1
   4172 030350  001404                          BEQ     TST303
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 746             <====
        030352  012742  000673                  MOV     #673,-(R2)      ;MOVE TO MAILBOX #  *******  673  *******
        030356  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        030360  000000                          HALT                    ;LOW ORDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
   4173                                                 ;MODE 2 /REG 7
   4174                                 ;*****************************************************************************
                                        ;TEST 303       MUL -1 * #100000 = 0 100000 PS=1
                                        ;*****************************************************************************
        030362  005212                  TST303: INC     (R2)            ;UPDATE TEST NUMBER
        030364  022712  000303                  CMP     #303,(R2)       ;SEQUENCE ERROR?
        030370  001031                          BNE     TST304-10       ;BR TO ERROR HALT ON SEQ ERROR
   4175 030372  012700  177777                  MOV     #-1,R0          ;LOAD MULTIPLICAN WITH -1
   4176 030376  070027  100000                  MUL     #100000,R0      ;MULTIPLY -1 BY 100000
   4177 030402  013767  177776  006060          MOV     @#PS,SPSW       ;SAVE PS
   4178 030410  122767  000001  006052          CMPB    #1,SPSW         ;IS PS =1
   4179 030416  001404                          BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 764             <====
        030420  012742  000674                  MOV     #674,-(R2)      ;MOVE TO MAILBOX #  *******  674  *******
        030424  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        030426  000000                          HALT                    ;PS IS WRONG
   4180 030430  022700  000000          1$:     CMP     #0,R0           ;IS HIGH ORDER = 0
   4181 030434  001404                          BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 755             <====
        030436  012742  000675                  MOV     #675,-(R2)      ;MOVE TO MAILBOX #  *******  675  *******
```

```
       030442  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       030444  000000                            HALT                    ;HIGH ORDER IS WRONG
  4182 030446  022701  100000           2$:      CMP     #100000,R1      ;IS LOW ORDER =100000
  4183 030452  001404                            BEQ     TST304
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                         ;           CONDITIONAL BRANCH INST. AND      <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                         ;           WHICH FOLLOWS W/ 746              <====
       030454  012742  000676                    MOV     #676,-(R2)      ;MOVE TO MAILBOX #  *******  676  *******
       030460  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       030462  000000                            HALT                    ;LOW ORDER IS WRONG
                                                                         ;  OR SEQUENCE ERROR
  4184
  4185
  4186
  4187                                           .SBTTL DIV USING DM6 REG 7
  4188                                  ;*****************************************************************************
                                        ;TEST 304           DIV 0 52525/S1=25252 REM=1 PS=0
                                        ;*****************************************************************************
       030464  005212                   TST304:  INC     (R2)            ;UPDATE TEST NUMBER
       030466  022712  000304                    CMP     #304,(R2)       ;SEQUENCE ERROR?
       030472  001035                            BNE     TST305-10       ;BR TO ERROR HALT ON SEQ ERROR
  4189 030474  012700  000000                    MOV     #0,R0           ;LOAD HIGH ORDER WITH R0
  4190 030500  012701  052525                    MOV     #52525,R1       ;LOAD LOW ORDER WITH 52525
  4191 030504  012703  036476                    MOV     #S1,R3          ; SET UP R3
  4192 030510  071067  005762                    DIV     S1,R0           ;DIVIDE BY S1
  4193 030514  013767  177776  005746            MOV     @#PS,SPSW       ;SAVE PS
  4194 030522  122767  000000  005740            CMPB    #0,SPSW         ;IS PS=0
  4195 030530  001404                            BEQ     1$
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                         ;           CONDITIONAL BRANCH INST. AND      <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                         ;           WHICH FOLLOWS W/ 760              <====
       030532  012742  000677                    MOV     #677,-(R2)      ;MOVE TO MAILBOX #  *******  677  *******
       030536  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       030540  000000                            HALT                    ;PS IS WRONG
  4196 030542  022700  025252           1$:      CMP     #25252,R0       ;IS QUOTIENT =25252
  4197 030546  001404                            BEQ     2$
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                         ;           CONDITIONAL BRANCH INST. AND      <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                         ;           WHICH FOLLOWS W/ 751              <====
       030550  012742  000700                    MOV     #700,-(R2)      ;MOVE TO MAILBOX #  *******  700  *******
       030554  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       030556  000000                            HALT                    ;QUOTIENT IS WRONG
  4198 030560  022701  000001           2$:      CMP     #1,R1           ;IS REMAINDER =1
  4199 030564  001404                            BEQ     TST305
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                         ;           CONDITIONAL BRANCH INST. AND      <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                         ;           WHICH FOLLOWS W/ 742              <====
       030566  012742  000701                    MOV     #701,-(R2)      ;MOVE TO MAILBOX #  *******  701  *******
       030572  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       030574  000000                            HALT                    ;REMAINDER IS WRONG
                                                                         ;  OR SEQUENCE ERROR
  4200
  4201                                           .SBTTL DIV USING DM7 REG 7
```

```
                                        ;*************************************************************************
                                        ;TEST 305        DUV 0 52525/@S2 =25252 REM=1 PS=0
                                        ;*************************************************************************
 030576  005212                         TST305: INC     (R2)            ;UPDATE TEST NUMBER
 030600  022712  000305                         CMP     #305,(R2)       ;SEQUENCE ERROR?
 030604  001035                                 BNE     TST306-10       ;BR TO ERROR HALT ON SEQ ERROR
 030606  012700  000000                         MOV     #0,R0           ;LOAD HIGH ORDER WITH R0
 030612  012701  052525                         MOV     #52525,R1       ;LOAD LOW ORDER WITH 52525
 030616  012704  036500                         MOV     #S2,R4          ; SET UP R4
 030622  071077  005652                         DIV     @S2,R0          ;DIVIDE BY @S2
 030626  013767  177776  005634                 MOV     @#PS,SPSW       ;SAVE PS
 030634  122767  000000  005626                 CMPB    #0,SPSW         ;IS PS=0
 030642  001404                                 BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 760             <====
 030644  012742  000702                         MOV     #702,-(R2)      ;MOVE TO MAILBOX #  *******  702  *******
 030650  005242                                 INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
 030652  000000                                 HALT                    ;PS IS WRONG
 030654  022700  025252                 1$:     CMP     #25252,R0       ;IS QUOTIENT =25252
 030660  001404                                 BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 751             <====
 030662  012742  000703                         MOV     #703,-(R2)      ;MOVE TO MAILBOX #  *******  703  *******
 030666  005242                                 INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
 030670  000000                                 HALT                    ;QUOTIENT IS WRONG
 030672  022701  000001                 2$:     CMP     #1,R1           ;IS REMINDER =1
 030676  001404                                 BEQ     TST306
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND     <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                        ;           WHICH FOLLOWS W/ 742             <====
 030700  012742  000704                         MOV     #704,-(R2)      ;MOVE TO MAILBOX #  *******  704  *******
 030704  005242                                 INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
 030706  000000                                 HALT                    ;REMINDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR


                                                .SBTTL DIV USING DM3 REG 7
                                                        ;CLEAR V-BIT MODE 3 REG 7
                                        ;*************************************************************************
                                        ;TEST 306        DIV 0 52525/@#S1 =25252 REM=1 PS=0
                                        ;*************************************************************************
 030710  005212                         TST306: INC     (R2)            ;UPDATE TEST NUMBER
 030712  022712  000306                         CMP     #306,(R2)       ;SEQUENCE ERROR?
 030716  001035                                 BNE     TST307-10       ;BR TO ERROR HALT ON SEQ ERROR
 030720  012700  000000                         MOV     #0,R0           ;LOAD HIGH ORDER WITH R0
 030724  012701  052525                         MOV     #52525,R1       ;LOAD LOW ORDER WITH 52525
 030730  012703  036476                         MOV     #S1,R3          ; SET UP R3
 030734  071037  036476                         DIV     @#S1,R0         ;DIVIDE BY @#S1
 030740  013767  177776  005522                 MOV     @#PS,SPSW       ;SAVE PS
 030746  122767  000000  005514                 CMPB    #0,SPSW         ;IS PS=0
 030754  001404                                 BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                   ;                CONDITIONAL BRANCH INST. AND       <====
                                                                   ;                REPLACE THE MOVE INSTRUCTION       <====
                                                                   ;                WHICH FOLLOWS W/ 760               <====
       030756  012742  000705                   MOV     #705,-(R2)      ;MOVE TO MAILBOX #  *******  705   *******
       030762  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       030764  000000                           HALT                    ;PS IS WRONG
  4226 030766  022700  025252           1$:     CMP     #25252,R0       ;IS QUOTIENT =25252
  4227 030772  001404                           BEQ     2$
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                   ;                CONDITIONAL BRANCH INST. AND       <====
                                                                   ;                REPLACE THE MOVE INSTRUCTION       <====
                                                                   ;                WHICH FOLLOWS W/ 751               <====
       030774  012742  000706                   MOV     #706,-(R2)      ;MOVE TO MAILBOX #  *******  706   *******
       031000  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       031002  000000                           HALT                    ;QUOTIENT IS WRONG
  4228 031004  022701  000001           2$:     CMP     #1,R1           ;IS REMAINDER =1
  4229 031010  001404                           BEQ     TST307
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                   ;                CONDITIONAL BRANCH INST. AND       <====
                                                                   ;                REPLACE THE MOVE INSTRUCTION       <====
                                                                   ;                WHICH FOLLOWS W/ 742               <====
       031012  012742  000707                   MOV     #707,-(R2)      ;MOVE TO MAILBOX #  *******  707   *******
       031016  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       031020  000000                           HALT                    ;REMAINDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
  4230
  4231                                          .SBTTL DIV USING DMO REG 4
  4232                                                  ;MODE 0 REG 2
  4233                                  ;*******************************************************************************************
                                        ;TEST 307       DIV 0 52525 /R4=25252 REM=1 PS=0
                                        ;*******************************************************************************************
       031022  005212                   TST307: INC     (R2)            ;UPDATE TEST NUMBER
       031024  022712  000307                   CMP     #307,(R2)       ;SEQUENCE ERROR?
       031030  001034                           BNE     TST310-10       ;BR TO ERROR HALT ON SEQ ERROR
  4234 031032  012700  000000                   MOV     #0,R0           ;LOAD HIGH ORDER WITH 0
  4235 031036  012701  052525                   MOV     #52525,R1       ;LOAD LOW ORDER WITH 52525
  4236 031042  012704  000002                   MOV     #2,R4           ; SET UP R4
  4237 031046  071004                           DIV     R4,R0           ;DIVIDE BY R4
  4238 031050  013767  177776  005412           MOV     @#PS,SPSW       ;SAVE PS
  4239 031056  122767  000000  005404           CMPB    #0,SPSW         ;IS PS=0
  4240 031064  001404                           BEQ     1$
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                   ;                CONDITIONAL BRANCH INST. AND       <====
                                                                   ;                REPLACE THE MOVE INSTRUCTION       <====
                                                                   ;                WHICH FOLLOWS W/ 761               <====
       031066  012742  000710                   MOV     #710,-(R2)      ;MOVE TO MAILBOX #  *******  710   *******
       031072  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       031074  000000                           HALT                    ;PS IS WRONG
  4241 031076  022700  025252           1$:     CMP     #25252,R0       ;IS QUOTIENT=25252
  4242 031102  001404                           BEQ     2$
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS       <====
                                                                   ;                CONDITIONAL BRANCH INST. AND       <====
                                                                   ;                REPLACE THE MOVE INSTRUCTION       <====
                                                                   ;                WHICH FOLLOWS W/ 752               <====
       031104  012742  000711                   MOV     #711,-(R2)      ;MOVE TO MAILBOX #  *******  711   *******
       031110  005242                           INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
       031112  000000                           HALT                    ;QUOTIENT IS WRONG
  4243 031114  022701  000001           2$:     CMP     #1,R1             ;IS REMAINDER =1
  4244 031120  001404                           BEQ     TST310
                                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                          ;           CONDITIONAL BRANCH INST. AND    <====
                                                                          ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                          ;           WHICH FOLLOWS W/ 743            <====
       031122  012742  000712                   MOV     #712,-(R2)        ;MOVE TO MAILBOX #  *******  712  *******
       031126  005242                           INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
       031130  000000                           HALT                      ;REMAINDER IS WRONG
                                                                          ;  OR SEQUENCE ERROR
  4245
  4246                                          .SBTTL DIV USING DM4 REG 3
  4247                                                  ;MODE 4 REG 3
  4248                                  ;*****************************************************************************
                                        ;TEST 310       DIV 0 52525 /-(3)=25252 REM=1 PS=0
                                        ;*****************************************************************************
       031132  005212                   TST310: INC     (R2)              ;UPDATE TEST NUMBER
       031134  022712  000310                   CMP     #310,(R2)         ;SEQUENCE ERROR?
       031140  001034                           BNE     TST311-10         ;BR TO ERROR HALT ON SEQ ERROR
  4249 031142  012700  000000                   MOV     #0,R0             ;LOAD HIGH ORDER WITH 0
  4250 031146  012701  052525                   MOV     #52525,R1         ;LOAD LOW ORDER WITH 52525
  4251 031152  012703  036500                   MOV     #S1+2,R3          ;SET UP R3
  4252 031156  071043                           DIV     -(R3),R0                 ;DIVIDE BY -(3)
  4253 031160  013767  177776  005302           MOV     @#PS,SPSW         ;SAVE PS
  4254 031166  122767  000000  005274           CMPB    #0,SPSW           ;IS PS=0
  4255 031174  001404                           BEQ     1$
                                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                          ;           CONDITIONAL BRANCH INST. AND    <====
                                                                          ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                          ;           WHICH FOLLOWS W/ 761            <====
       031176  012742  000713                   MOV     #713,-(R2)        ;MOVE TO MAILBOX #  *******  713  *******
       031202  005242                           INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
       031204  000000                           HALT                      ;PS IS WRONG
  4256 031206  022700  025252           1$:     CMP     #25252,R0         ;IS QUOTIENT =25252
  4257 031212  001404                           BEQ     2$
                                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                          ;           CONDITIONAL BRANCH INST. AND    <====
                                                                          ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                          ;           WHICH FOLLOWS W/ 752            <====
       031214  012742  000714                   MOV     #714,-(R2)        ;MOVE TO MAILBOX #  *******  714  *******
       031220  005242                           INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
       031222  000000                           HALT                      ;QUOTIENT IS WRONG
  4258 031224  022701  000001           2$:     CMP     #1,R1             ;IS REMAINDER =1
  4259 031230  001404                           BEQ     TST311
                                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                          ;           CONDITIONAL BRANCH INST. AND    <====
                                                                          ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                          ;           WHICH FOLLOWS W/ 743            <====
       031232  012742  000715                   MOV     #715,-(R2)        ;MOVE TO MAILBOX #  *******  715  *******
       031236  005242                           INC     -(R2)             ;SET MSGTYP TO FATAL ERROR
       031240  000000                           HALT                      ;REMAINDER IS WRONG
                                                                          ;  OR SEQUENCE ERROR
  4260                                          .SBTTL DIV USING DM5 REG 4
  4261                                                  ;MODE 5 REG 4
  4262                                  ;*****************************************************************************
                                        ;TEST 311       DIV 0 52525 /@-(4)=25252 REM=1 PS=0
                                        ;*****************************************************************************
```

```
     031242  005212                          TST311: INC     (R2)                    ;UPDATE TEST NUMBER
     031244  022712  000311                          CMP     #311,(R2)               ;SEQUENCE ERROR?
     031250  001034                                  BNE     TST312-10               ;BR TO ERROR HALT ON SEQ ERROR
     031252  012700  000000                          MOV     #0,R0                   ;LOAD HIGH ORDER WITH 0
     031256  012701  052525                          MOV     #52525,R1               ;LOAD LOW ORDER WITH 52525
     031262  012704  036502                          MOV     #S2+2,R4                        ;SET UP R4
     031266  071054                                  DIV     @-(R4),R0               ;DIVIDE BY @-(4)
     031270  013767  177776  005172                  MOV     @#PS,SPSW               ;SAVE PS
     031276  122767  000000  005164                  CMPB    #0,SPSW                 ;IS PS = 0
     031304  001404                                  BEQ     1$
                                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                                 ;           CONDITIONAL BRANCH INST. AND    <====
                                                                                 ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                                 ;           WHICH FOLLOWS W/ 761            <====
     031306  012742  000716                          MOV     #716,-(R2)              ;MOVE TO MAILBOX #  *******  716  *******
     031312  005242                                  INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
     031314  000000                                  HALT                            ;PS IS WRONG
     031316  022700  025252                  1$:     CMP     #25252,R0               ;IS QUOTIENT =25252
     031322  001404                                  BEQ     2$
                                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                                 ;           CONDITIONAL BRANCH INST. AND    <====
                                                                                 ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                                 ;           WHICH FOLLOWS W/ 752            <====
     031324  012742  000717                          MOV     #717,-(R2)              ;MOVE TO MAILBOX #  *******  717  *******
     031330  005242                                  INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
     031332  000000                                  HALT                            ;QUOTIENT IS WRONG
     031334  022701  000001                  2$:     CMP     #1,R1                   ;IS REMAINDER =1
     031340  001404                                  BEQ     TST312
                                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                                 ;           CONDITIONAL BRANCH INST. AND    <====
                                                                                 ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                                 ;           WHICH FOLLOWS W/ 743            <====
     031342  012742  000720                          MOV     #720,-(R2)              ;MOVE TO MAILBOX #  *******  720  *******
     031346  005242                                  INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
     031350  000000                                  HALT                            ;REMAINDER IS WRONG
                                                                                 ;  OR SEQUENCE ERROR

                                                             ;MODE 5 REG 4
                                             ;*******************************************************************************
                                             ;TEST 312        DIV 0 52525 /@-(R4)=100000 REM=0 PS=2
                                             ;*******************************************************************************
     031352  005212                          TST312: INC     (R2)                    ;UPDATE TEST NUMBER
     031354  022712  000312                          CMP     #312,(R2)               ;SEQUENCE ERROR?
     031360  001034                                  BNE     TST313-10               ;BR TO ERROR HALT ON SEQ ERROR
     031362  012700  052525                          MOV     #52525,R0               ;LOAD HIGH ORDER WITH 52525
     031366  012704  036502                          MOV     #S2+2,R4                        ;SET UP R4
     031372  012701  000000                          MOV     #0,R1                   ;LOAD LOW ORDER WITH 0
     031376  071054                                  DIV     @-(R4),R0               ;DIVIDE BY @-(4)
     031400  013767  177776  005062                  MOV     @#PS,SPSW               ;SAVE PS
     031406  122767  000002  005054                  CMPB    #2,SPSW                 ;IS PS=0
     031414  001404                                  BEQ     1$
                                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                                 ;           CONDITIONAL BRANCH INST. AND    <====
                                                                                 ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                                 ;           WHICH FOLLOWS W/ 761            <====
     031416  012742  000721                          MOV     #721,-(R2)              ;MOVE TO MAILBOX #  *******  721  *******
     031422  005242                                  INC     -(R2)                   ;SET MSGTYP TO FATAL ERROR
```

```
      031424  000000                            HALT                    ;PS IS WRONG
 4284 031426  022700  052525            1$:     CMP     #52525,R0       ;IS QUOTIENT =52525
 4285 031432  001404                            BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 752            <====
      031434  012742  000722                    MOV     #722,-(R2)      ;MOVE TO MAILBOX #  *******  722  *******
      031440  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      031442  000000                            HALT                    ;QUOTIENT IS WRONG
 4286 031444  022701  000000            2$:     CMP     #0,R1           ;IS REMAINDER =0
 4287 031450  001404                            BEQ     TST313
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 743            <====
      031452  012742  000723                    MOV     #723,-(R2)      ;MOVE TO MAILBOX #  *******  723  *******
      031456  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      031460  000000                            HALT                    ;REMAINDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
 4288
 4289                                           .SBTTL DIV USING DM2 REG 7
 4290                                                   ;MODE 2 REG 7
 4291                                   ;*************************************************************************
                                        ;TEST 313       DIV -1 -4/#2= -2 REM=0 PS=10
                                        ;*************************************************************************
      031462  005212                    TST313: INC     (R2)            ;UPDATE TEST NUMBER
      031464  022712  000313                    CMP     #313,(R2)       ;SEQUENCE ERROR?
      031470  001033                            BNE     TST314-10       ;BR TO ERROR HALT ON SEQ ERROR
 4292 031472  012700  177777                    MOV     #-1,R0          ;LOAD HIGH ORDER WITH -1
 4293 031476  012701  177774                    MOV     #-4,R1  ;LOAD LOW ORDER WITH -4
 4294 031502  071027  000002                    DIV     #2,R0           ;DIVIDE BY #2
 4295 031506  013767  177776  004754            MOV     @#PS,SPSW       ;SAVE PS
 4296 031514  122767  000010  004746            CMPB    #10,SPSW                ;IS PS =10
 4297 031522  001404                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 762            <====
      031524  012742 `000724                    MOV     #724,-(R2)      ;MOVE TO MAILBOX #  *******  724  *******
      031530  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      031532  000000                            HALT                    ;PS IS WRONG
 4298 031534  022700  177776            1$:     CMP     #-2,R0          ;IS QUOTIENT = -2
 4299 031540  001404                            BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 753            <====
      031542  012742  000725                    MOV     #725,-(R2)      ;MOVE TO MAILBOX #  *******  725  *******
      031546  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      031550  000000                            HALT                    ;QUOTIENT IS WRONG
 4300 031552  022701  000000            2$:     CMP     #0,R1           ;IS REMAINDER =0
 4301 031556  001404                            BEQ     TST314
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 744            <====
        031560  012742  000726                 MOV     #726,-(R2)      ;MOVE TO MAILBOX #  *******  726  *******
        031564  005242                         INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        031566  000000                         HALT                    ;REMAINDER IS WRONG
                                                                       ;  OR SEQUENCE ERROR
   4302
   4303                                                :MODE 2 REG 7
   4304                                ;*******************************************************************************
                                       ;TEST 314          DIV 0 0/ #1 = 0 REM=0 PS=4
                                       ;*******************************************************************************
        031570  005212                 TST314: INC     (R2)            ;UPDATE TEST NUMBER
        031572  022712  000314                 CMP     #314,(R2)       ;SEQUENCE ERROR?
        031576  001033                         BNE     TST315-10       ;BR TO ERROR HALT ON SEQ ERROR
   4305 031600  012700  000000                 MOV     #0,R0           ;LOAD HIGH ORDER WITH 0
   4306 031604  012701  000000                 MOV     #0,R1           ;LOAD LOW ORDER WITH 0
   4307 031610  071027  000001                 DIV     #1,R0           ;DIVIDE BY #1
   4308 031614  013767  177776  004646         MOV     @#PS,SPSW       ;SAVE PS
   4309 031622  122767  000004  004640         CMPB    #4,SPSW         ;IS PS =4
   4310 031630  001404                         BEQ     1$
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 762            <====
        031632  012742  000727                 MOV     #727,-(R2)      ;MOVE TO MAILBOX #  *******  727  *******
        031636  005242                         INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        031640  000000                         HALT                    ;PS IS WRONG
   4311 031642  022700  000000         1$:     CMP     #0,R0           ;IS QUOTIENT =0
   4312 031646  001404                         BEQ     2$
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 753            <====
        031650  012742  000730                 MOV     #730,-(R2)      ;MOVE TO MAILBOX #  *******  730  *******
        031654  005242                         INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        031656  000000                         HALT                    ;QUOTIENT IS WRONG
   4313 031660  022701  000000         2$:     CMP     #0,R1           ;IS REMAINDER =0
   4314 031664  001404                         BEQ     TST315
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 744            <====
        031666  012742  000731                 MOV     #731,-(R2)      ;MOVE TO MAILBOX #  *******  731  *******
        031672  005242                         INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
        031674  000000                         HALT                    ;REMAINDER IS WRONG
                                                                       ;  OR SEQUENCE ERROR
   4315
   4316                                                :MODE 2 REG 7
   4317                                ;*******************************************************************************
                                       ;TEST 315          DIV 0 52525 / #2=25252 REM=1 PS=0
                                       ;*******************************************************************************
        031676  005212                 TST315: INC     (R2)            ;UPDATE TEST NUMBER
        031700  022712  000315                 CMP     #315,(R2)       ;SEQUENCE ERROR?
        031704  001033                         BNE     TST316-10       ;BR TO ERROR HALT ON SEQ ERROR
   4318 031706  012700  000000                 MOV     #0,R0           ;LOAD HIGH ORDER WITH 0
   4319 031712  012701  052525                 MOV     #52525,R1       ;LOAD LOW ORDER WITH 52525
   4320 031716  071027  000002                 DIV     #2,R0           ;DIVIDE BY #2
   4321 031722  013767  177776  004540         MOV     @#PS,SPSW       ;SAVE PS
   4322 031730  122767  000000  004532         CMPB    #0,SPSW         ;IS PS =0
```

```
 4323 031736  001404                          BEQ     1$
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                   ;           CONDITIONAL BRANCH INST. AND      <====
                                                                   ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                   ;           WHICH FOLLOWS W/ 762              <====
      031740  012742  000732                  MOV     #732,-(R2)   ;MOVE TO MAILBOX #  *******  732  *******
      031744  005242                          INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
      031746  000000                          HALT                 ;PS IS WRONG
 4324 031750  022700  025252          1$:     CMP     #25252,R0    ;IS QUOTIENT =25252
 4325 031754  001404                          BEQ     2$
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                   ;           CONDITIONAL BRANCH INST. AND      <====
                                                                   ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                   ;           WHICH FOLLOWS W/ 753              <====
      031756  012742  000733                  MOV     #733,-(R2)   ;MOVE TO MAILBOX #  *******  733  *******
      031762  005242                          INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
      031764  000000                          HALT                 ;QUOTIENT IS WRONG
 4326 031766  022701  000001          2$:     CMP     #1,R1        ;IS REMAINDER =1
 4327 031772  001404                          BEQ     TST316
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                   ;           CONDITIONAL BRANCH INST. AND      <====
                                                                   ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                   ;           WHICH FOLLOWS W/ 744              <====
      031774  012742  000734                  MOV     #734,-(R2)   ;MOVE TO MAILBOX #  *******  734  *******
      032000  005242                          INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
      032002  000000                          HALT                 ;REMAINDER IS WRONG
                                                                   ;  OR SEQUENCE ERROR
 4328
 4329                                                 ;MODE 2 REG 7
 4330                                 ;*****************************************************************************
                                      ;TEST 316       DIV 25253 0 / #125252=100000 REM=0 PS=10
                                      ;*****************************************************************************
      032004  005212                  TST316: INC     (R2)         ;UPDATE TEST NUMBER
      032006  022712  000316                  CMP     #316,(R2)    ;SEQUENCE ERROR?
      032012  001033                          BNE     TST317-10    ;BR TO ERROR HALT ON SEQ ERROR
 4331 032014  012700  025253                  MOV     #25253,R0    ;LOAD HIGH ORDER WITH 25253
 4332 032020  012701  000000                  MOV     #0,R1        ;LOAD LOW ORDER WITH 0
 4333 032024  071027  125252                  DIV     #125252,R0   ;DIVIDE BY #125252
 4334 032030  013767  177776  004432          MOV     @#PS,SPSW    ;SAVE PS
 4335 032036  122767  000010  004424          CMPB    #10,SPSW            ;IS PS =10
 4336 032044  001404                          BEQ     1$
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                   ;           CONDITIONAL BRANCH INST. AND      <====
                                                                   ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                   ;           WHICH FOLLOWS W/ 762              <====
      032046  012742  000735                  MOV     #735,-(R2)   ;MOVE TO MAILBOX #  *******  735  *******
      032052  005242                          INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
      032054  000000                          HALT                 ;PS IS WRONG
 4337 032056  022700  100000          1$:     CMP     #100000,R0   ;IS QUOTIENT =100000
 4338 032062  001404                          BEQ     2$
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS      <====
                                                                   ;           CONDITIONAL BRANCH INST. AND      <====
                                                                   ;           REPLACE THE MOVE INSTRUCTION      <====
                                                                   ;           WHICH FOLLOWS W/ 753              <====
      032064  012742  000736                  MOV     #736,-(R2)   ;MOVE TO MAILBOX #  *******  736  *******
      032070  005242                          INC     -(R2)        ;SET MSGTYP TO FATAL ERROR
      032072  000000                          HALT                 ;QUOTIENT IS WRONG
```

```
032074  022701  000000          2$:     CMP     #0,R1           ;IS REMAINDER =0
032100  001404                          BEQ     TST317
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 744            <====
032102  012742  000737                  MOV     #737,-(R2)      ;MOVE TO MAILBOX #  *******  737  *******
032106  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
032110  000000                          HALT                    ;REMAINDER IS WRONG
                                                                ;  OR SEQUENCE ERROR
                                                ;MODE 2 REG 7
                                ;*******************************************************************************
                                ;TEST 317       DIV -1 -1 / #-1=1 REM=0 PS=0
                                ;*******************************************************************************
032112  005212                  TST317: INC     (R2)            ;UPDATE TEST NUMBER
032114  022712  000317                  CMP     #317,(R2)       ;SEQUENCE ERROR?
032120  001033                          BNE     TST320-10       ;BR TO ERROR HALT ON SEQ ERROR
032122  012700  177777                  MOV     #-1,R0          ;LOAD HIGH ORDER WITH -1
032126  012701  177777                  MOV     #-1,R1  ;LOAD LOW ORDER WITH -1
032132  071027  177777                  DIV     #-1,R0          ;DIVIDE BY #-1
032136  013767  177776  004324          MOV     @#PS,SPSW       ;SAVE PS
032144  122767  000000  004316          CMPB    #0,SPSW         ;IS PS =0
032152  001404                          BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 762            <====
032154  012742  000740                  MOV     #740,-(R2)      ;MOVE TO MAILBOX #  *******  740  *******
032160  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
032162  000000                          HALT                    ;PS IS WRONG
032164  022700  000001          1$:     CMP     #1,R0           ;IS QUOTIENT =1
032170  001404                          BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 753            <====
032172  012742  000741                  MOV     #741,-(R2)      ;MOVE TO MAILBOX #  *******  741  *******
032176  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
032200  000000                          HALT                    ;QUOTIENT IS WRONG
032202  022701  000000          2$:     CMP     #0,R1           ;IS REMAINDER =0
032206  001404                          BEQ     TST320
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 744            <====
032210  012742  000742                  MOV     #742,-(R2)      ;MOVE TO MAILBOX #  *******  742  *******
032214  005242                          INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
032216  000000                          HALT                    ;REMAINDER IS WRONG
                                                                ;  OR SEQUENCE ERROR

                                                ;MODE 2 REG 7
                                ;*******************************************************************************
                                ;TEST 320       DIV 0 177777/#0=0 REM=0 PS=3
                                ;*******************************************************************************
032220  005212                  TST320: INC     (R2)            ;UPDATE TEST NUMBER
032222  022712  000320                  CMP     #320,(R2)       ;SEQUENCE ERROR?
032226  001020                          BNE     TST321-10       ;BR TO ERROR HALT ON SEQ ERROR
```

```
 4356 032230  012704  177777                MOV     #177777,R4              ;LOAD HIGH ORDER WITH 177777
 4357 032234  012705  000000                MOV     #0,R5    ;LOAD LOW ORDER WITH 0
 4358 032240  071427  000000                DIV     #0,R4           ;DIVIDE BY #2
 4359 032244  013767  177776  004216        MOV     @#PS,SPSW       ;SAVE PS
 4360 032252  042767  000014  004210        BIC     #14,SPSW
 4361 032260  122767  000003  004202        CMPB    #3,SPSW         ;IS PS =3
 4362 032266  001404                        BEQ     TST321
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 757            <====
      032270  012742  000743                MOV     #743,-(R2)      ;MOVE TO MAILBOX #  *******  743  *******
      032274  005242                        INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      032276  000000                        HALT                    ;PS IS WRONG
                                                                ;  OR SEQUENCE ERROR
 4363
 4364                                               ;MODE 2 REG 7
 4365                               ;*******************************************************************************
                                    ;TEST 321       DIV 0 100000 00000 /#100000 REM=0 PS=2
                                    ;*******************************************************************************
      032300  005212                TST321: INC     (R2)            ;UPDATE TEST NUMBER
      032302  022712  000321                CMP     #321,(R2)       ;SEQUENCE ERROR?
      032306  001020                        BNE     TST322-10       ;BR TO ERROR HALT ON SEQ ERROR
 4366 032310  012704  100000                MOV     #100000,R4      ;LOAD HIGH ORDER WITH 100000
 4367 032314  012705  000000                MOV     #0,R5    ;LOAD LOW ORDER WITH 0
 4368 032320  071427  000002                DIV     #2,R4           ;DIVIDE BY #2
 4369 032324  013767  177776  004136        MOV     @#PS,SPSW       ;SAVE PS
 4370 032332  042767  000014  004130        BIC     #14,SPSW
 4371 032340  122767  000002  004122        CMPB    #2,SPSW         ;IS PS=2
 4372 032346  001404                        BEQ     TST322
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 757            <====
      032350  012742  000744                MOV     #744,-(R2)      ;MOVE TO MAILBOX #  *******  744  *******
      032354  005242                        INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
      032356  000000                        HALT                    ;PS IS WRONG
                                                                ;  OR SEQUENCE ERROR
 4373
 4374                                               ;MODE 2 REG 7
 4375                               ;*******************************************************************************
                                    ;TEST 322       DIV 0 77777/#0=0 REM=0 PS=3
                                    ;*******************************************************************************
      032360  005212                TST322: INC     (R2)            ;UPDATE TEST NUMBER
      032362  022712  000322                CMP     #322,(R2)       ;SEQUENCE ERROR?
      032366  001053                        BNE     TST323-10       ;BR TO ERROR HALT ON SEQ ERROR
 4376 032370  012704  000000                MOV     #0,R4           ;LOAD HIGH ORDER WITH 0
 4377 032374  012705  077777                MOV     #77777,R5       ;LOAD LOW ORDER WITH 77777
 4378 032400  071427  000000                DIV     #0,R4           ;DIVIDE BY 0
 4379 032404  013767  177776  004056        MOV     @#PS,SPSW       ;SAVE PS
 4380 032412  042767  000014  004050        BIC     #14,SPSW
 4381 032420  122767  000003  004042        CMPB    #3,SPSW         ;IS PS =3
 4382 032426  001430                        BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                ;           WHICH FOLLOWS W/ 757            <====
     032430  012742  000745                      MOV     #745,-(R2)       ;MOVE TO MAILBOX #  *******  745  *******
     032434  005242                              INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     032436  000000                              HALT                     ;PS IS WRONG

     032440  012704  000000                      MOV     #0,R4            ;LOAD HIGH ORDER WITH 0
     032444  012705  077777                      MOV     #77777,R5        ;LOAD LOW ORDER WITH 77777
     032450  071427  000000                      DIV     #0,R4            ;DIVIDE BY 0
     032454  013767  177776  004006              MOV     @#PS,SPSW        ;SAVE PS
     032462  042767  000014  004000              BIC     #14,SPSW
     032470  122767  000003  003772              CMPB    #3,SPSW          ;IS PS =3
     032476  001413                              BEQ     TST323
                                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                          ;           CONDITIONAL BRANCH INST. AND     <====
                                                                          ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                          ;           WHICH FOLLOWS W/ 733             <====
     032500  012742  000746                      MOV     #746,-(R2)       ;MOVE TO MAILBOX #  *******  746  *******
     032504  005242                              INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     032506  000000                              HALT                     ;PS IS WRONG
                                                                          ;  OR SEQUENCE ERROR

     032510  022705  077777             2$:      CMP     #77777,R5              ;IS REMAINDER =1
     032514  001404                              BEQ     TST323
                                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                          ;           CONDITIONAL BRANCH INST. AND     <====
                                                                          ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                          ;           WHICH FOLLOWS W/ 724             <====
     032516  012742  000747                      MOV     #747,-(R2)       ;MOVE TO MAILBOX #  *******  747  *******
     032522  005242                              INC     -(R2)            ;SET MSGTYP TO FATA  ERROR
     032524  000000                              HALT                     ;REMAINDER IS WRONG
                                                                          ;  OR SEQUENCE ERROR

                                                         ;MODE 2 REG 7
                                        ;*******************************************************************************
                                        ;TEST 323        DIV 25253 0 / #125252=100000 REM=0 PS=10
                                        ;*******************************************************************************
     032526  005212                     TST323:  INC     (R2)             ;UPDATE TEST NUMBER
     032530  022712  000323                      CMP     #323,(R2)        ;SEQUENCE ERROR?
     032534  001033                              BNE     TST324-10        ;BR TO ERROR HALT ON SEQ ERROR
     032536  012700  025253                      MOV     #25253,R0        ;LOAD HIGH ORDER WITH 25253
     032542  012701  000000                      MOV     #0,R1            ;LOAD LOW ORDER WITH 0
     032546  071027  125252                      DIV     #125252,R0       ;DIVIDE BY #125252
     032552  013767  177776  003710              MOV     @#PS,SPSW        ;SAVE PS
     032560  122767  000010  003702              CMPB    #10,SPSW         ;IS PS =10
     032566  001404                              BEQ     1$
                                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                          ;           CONDITIONAL BRANCH INST. AND     <====
                                                                          ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                          ;           WHICH FOLLOWS W/ 762             <====
     032570  012742  000750                      MOV     #750,-(R2)       ;MOVE TO MAILBOX #  *******  750  *******
     032574  005242                              INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     032576  000000                              HALT                     ;PS IS WRONG
     032600  022700  100000             1$:      CMP     #100000,R0       ;IS QUOTIENT =100000
     032604  001404                              BEQ     2$
                                                                          ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS     <====
                                                                          ;           CONDITIONAL BRANCH INST. AND     <====
                                                                          ;           REPLACE THE MOVE INSTRUCTION     <====
                                                                          ;           WHICH FOLLOWS W/ 753             <====
     032606  012742  000751                     MOV     #751,-(R2)         ;MOVE TO MAILBOX #  *******  751  *******
     032612  005242                             INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     032614  000000                             HALT                       ;QUOTIENT IS WRONG
4405 032616  022701  000000         2$:         CMP     #0,R1              ;IS REMAINDER =0
4406 032622  001404                             BEQ     TST324
                                                                           ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                           ;           CONDITIONAL BRANCH INST. AND    <====
                                                                           ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                           ;           WHICH FOLLOWS W/ 744            <====
     032624  012742  000752                     MOV     #752,-(R2)         ;MOVE TO MAILBOX #  *******  752  *******
     032630  005242                             INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     032632  000000                             HALT                       ;REMAINDER IS WRONG
                                                                           ;  OR SEQUENCE ERROR
4407                                                    ;MODE 2 REG 7
4408                                ;***********************************************************************************
                                    ;TEST 324        DIV -1 -1 /#-1=1 REM=0 PS=0
                                    ;***********************************************************************************
     032634  005212                 TST324:     INC     (R2)               ;UPDATE TEST NUMBER
     032636  022712  000324                     CMP     #324,(R2)          ;SEQUENCE ERROR?
     032642  001033                             BNE     TST325-10          ;BR TO ERROR HALT ON SEQ ERROR
4409 032644  012700  177777                     MOV     #-1,R0             ;LOAD HIGH ORDER WITH -1
4410 032650  012701  177777                     MOV     #-1,R1             ;LOAD LOW ORDER WITH -1
4411 032654  071027  177777                     DIV     #-1,R0             ;DIVIDE BY #-1
4412 032660  013767  177776  003602             MOV     @#PS,SPSW          ;SAVE PS
4413 032666  122767  000000  003574             CMPB    #0,SPSW            ;IS PS =0
4414 032674  001404                             BEQ     1$
                                                                           ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                           ;           CONDITIONAL BRANCH INST. AND    <====
                                                                           ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                           ;           WHICH FOLLOWS W/ 762            <====
     032676  012742  000753                     MOV     #753,-(R2)         ;MOVE TO MAILBOX #  *******  753  *******
     032702  005242                             INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     032704  000000                             HALT                       ;PS IS WRONG
4415 032706  022700  000001         1$:         CMP     #1,R0              ;IS QUOTIENT =1
4416 032712  001404                             BEQ     2$
                                                                           ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                           ;           CONDITIONAL BRANCH INST. AND    <====
                                                                           ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                           ;           WHICH FOLLOWS W/ 753            <====
     032714  012742  000754                     MOV     #754,-(R2)         ;MOVE TO MAILBOX #  *******  754  *******
     032720  005242                             INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     032722  000000                             HALT                       ;QUOTIENT IS WRONG
4417 032724  022701  000000         2$:         CMP     #0,R1              ;IS REMAINDER =0
4418 032730  001404                             BEQ     TST325
                                                                           ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                           ;           CONDITIONAL BRANCH INST. AND    <====
                                                                           ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                           ;           WHICH FOLLOWS W/ 744            <====
     032732  012742  000755                     MOV     #755,-(R2)         ;MOVE TO MAILBOX #  *******  755  *******
     032736  005242                             INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     032740  000000                             HALT                       ;REMAINDER IS WRONG
                                                                           ;  OR SEQUENCE ERROR
4419                                                    ;MODE 2 REG 7
4420                                ;***********************************************************************************
                                    ;TEST 325        DIV 0 177777/#0=0 REM=0 PS=3
                                    ;***********************************************************************************
     032742  005212                 TST325:     INC     (R2)               ;UPDATE TEST NUMBER
     032744  022712  000325                    CMP     #325,(R2)       ;SEQUENCE ERROR?
     032750  001020                            BNE     TST326-10       ;BR TO ERROR HALT ON SEQ ERROR
4421 032752  012704  177777                    MOV     #177777,R4      ;LOAD HIGH ORDER WITH 177777
4422 032756  012705  000000                    MOV     #0,R5           ;LOAD LOW ORDER WITH 0
4423 032762  071427  000000                    DIV     #0,R4           ;DIVE BY #2
4424 032766  013767  177776  003474            MOV     @#PS,SPSW       ;SAVE PS
4425 032774  042767  000014  003466            BIC     #14,SPSW
4426 033002  122767  000003  003460            CMPB    #3,SPSW         ;IS PS =3
4427 033010  001404                            BEQ     TST326
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 757            <====
     033012  012742  000756                    MOV     #756,-(R2)      ;MOVE TO MAILBOX #  *******  756  *******
     033016  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     033020  000000                            HALT                    ;PS IS WRONG
                                                                       ;  OR SEQUENCE ERROR
4428                                                   ;MODE 2 REG 7
4429                                     ;*******************************************************************************
                                         ;TEST 326       DIV 0 100000 000000 /#2=100000 REM=0 PS=2
                                         ;*******************************************************************************
     033022  005212                      TST326: INC     (R2)            ;UPDATE TEST NUMBER
     033024  022712  000326                    CMP     #326,(R2)       ;SEQUENCE ERROR?
     033030  001020                            BNE     TST327-10       ;BR TO ERROR HALT ON SEQ ERROR
4430 033032  012704  100000                    MOV     #100000,R4      ;LOAD HIGH ORDER WITH 100000
4431 033036  012705  000000                    MOV     #0,R5           ;LOAD LOW ORDER WITHO
4432 033042  071427  000002                    DIV     #2,R4           ;DIVIDE BY #2
4433 033046  013767  177776  003414            MOV     @#PS,SPSW       ;SAVE PS
4434 033054  042767  000014  003406            BIC     #14,SPSW
4435 033062  122767  000002  003400            CMPB    #2,SPSW         ;IS PS=2
4436 033070  001404                            BEQ     TST327
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 757            <====
     033072  012742  000757                    MOV     #757,-(R2)      ;MOVE TO MAILBOX #  *******  757  *******
     033076  005242                            INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     033100  000000                            HALT                    ;PS IS WRONG
                                                                       ;  OR SEQUENCE ERROR
4437                                                   ;MODE 2 REG 7
4438                                     ;*******************************************************************************
                                         ;TEST 327       DIV 0 77777 /#0=0 REM=0 PS=3
                                         ;*******************************************************************************
     033102  005212                      TST327: INC     (R2)            ;UPDATE TEST NUMBER
     033104  022712  000327                    CMP     #327,(R2)       ;SEQUENCE ERROR?
     033110  001020                            BNE     TST330-10       ;BR TO ERROR HALT ON SEQ ERROR
4439 033112  012704  000000                    MOV     #0,R4           ;LOAD HIGH ORDER WITH 0
4440 033116  012705  077777                    MOV     #77777,R5       ;LOAD LOW ORDER WITH 77777
4441 033122  071427  000000                    DIV     #0,R4           ;DIVIDE BY 0
4442 033126  013767  177776  003334            MOV     @#PS,SPSW       ;SAVE PS
4443 033134  042767  000014  003326            BIC     #14,SPSW
4444 033142  122767  000003  003320            CMPB    #3,SPSW         ;IS PS =3
4445 033150  001404                            BEQ     TST330
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 757            <====
     033152  012742  000760                   MOV     #760,-(R2)       ;MOVE TO MAILBOX #  *******  760  *******
     033156  005242                           INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     033160  000000                           HALT                     ;PS IS WRONG
                                                                       ;  OR SEQUENCE ERROR
4446                                 ;*****************************************************************************
                                     ;TEST 330        TEST SUB INSTRUCTION MODES 2-7
                                     ;*****************************************************************************
     033162  005212                  TST330:  INC     (R2)             ;UPDATE TEST NUMBER
     033164  022712  000330                   CMP     #330,(R2)        ;SEQUENCE ERROR?
     033170  001075                           BNE     TST331-10        ;BR TO ERROR HALT ON SEQ ERROR
4447 033172  012700  177777                   MOV     #-1,R0           ;SETUP SOURCE TO -1
4448 033176  010037  033250                   MOV     R0,@#2$+2        ;SET MODE 2 TO LOCATION TO A -1
4449 033202  012701  036474                   MOV     #SUBT+2,R1       ;SET R1 TO POINT TO BUFFER AREA +2
4450 033206  012761  177777  177776           MOV     #-1,-2(R1)       ;PUT -1 OP INTO DEST. BUFFER AREA
4451 033214  160041                           SUB     R0,-(R1)         ;MODE-4 SUB SOURCE MODE 0 DEST MODE 4
4452 033216  001404                           BEQ     1$
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 764            <====
     033220  012742  000761                   MOV     #761,-(R2)       ;MOVE TO MAILBOX #  *******  761  *******
     033224  005242                           INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     033226  000000                           HALT                     ;SUB -1 FROM -1 FAILED TO GIVE ZERO RESULT IN MODE 4
4453 033230  022701  036472          1$:      CMP     #SUBT,R1         ;VARIFY AUTO-DECREMENT OF R1 IN MODE 4 WORKED
4454 033234  001404                           BEQ     2$
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 755            <====
     033236  012742  000762                   MOV     #762,-(R2)       ;MOVE TO MAILBOX #  *******  762  *******
     033242  005242                           INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     033244  000000                           HALT                     ;R1 FAILED  TO DECEREMENT IN  MODE 4
4455 033246  160027  177777          2$:      SUB     R0,#-1           ;IF PROC HALTS AT PC=32650 THEN AUTO INC MODE FAILED
4456 033252  001404                           BEQ     3$
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 746            <====
     033254  012742  000763                   MOV     #763,-(R2)       ;MOVE TO MAILBOX #  *******  763  *******
     033260  005242                           INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     033262  000000                           HALT                     ;SUB -1 FROM -1 FAILED TO GIVE ZERO RESULT
4457 033264  012711  177777          3$:      MOV     #-1,(R1)         ;RESET SUBT TO A -1
4458 033270  160037  036472                   SUB     R0,@#SUBT        ;SET MODE-3
4459 033274  001404                           BEQ     4$
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 735            <====
     033276  012742  000764                   MOV     #764,-(R2)       ;MOVE TO MAILBOX #  *******  764  *******
     033302  005242                           INC     -(R2)            ;SET MSGTYP TO FATAL ERROR
     033304  000000                           HALT                     ;SUB -1 FROM -1 FAILED TO GIVE A ZERO RESULT
4460 033306  012703  036476          4$:      MOV     #SUBT+4,R3       ;SETUP FOR MODE 5
4461 033312  012711  177777                   MOV     #-1,(R1)         ;RESET SUBT TO A 1-
4462 033316  160053                           SUB     R0,@-(R3)        ;SUB -1 FROM -1 USING MODE-5
4463 033320  001404                           BEQ     5$
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                   ;                   REPLACE THE MOVE INSTRUCTION    <====
                                                                   ;                   WHICH FOLLOWS W/ 723            <====
      033322  012742  000765                   MOV     #765,-(R2)  ;MOVE TO MAILBOX #  *******  765  *******
      033326  005242                           INC     -(R2)       ;SET MSGTYP TO FATAL ERROR
      033330  000000                           HALT                ;SUB -1 FROM -1 FAILED TO GIVE ZERO RESULT
 4464 033332  012711  177777          5$:      MOV     #-1,(R1)    ;RESET SUBT TO A -1
 4465 033336  160061  000000                   SUB     R0,0(R1)    ;MODE-6
 4466 033342  001404                           BEQ     6$

                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                   ;                   CONDITIONAL BRANCH INST. AND    <====
                                                                   ;                   REPLACE THE MOVE INSTRUCTION    <====
                                                                   ;                   WHICH FOLLOWS W/ 712            <====
      033344  012742  000766                   MOV     #766,-(R2)  ;MOVE TO MAILBOX #  *******  766  *******
      033350  005242                           INC     -(R2)       ;SET MSGTYP TO FATAL ERROR
      033352  000000                           HALT                ;SUB -1 FROM -1 FAILED TO GIVE ZERO RESULT
 4467 033354  010011                  6$:      MOV     R0,(R1)     ;RESET SUBT TO A -1
 4468 033356  160071  000002                   SUB     R0,@2(R1)   ;MODE-7
 4469 033362  001404                           BEQ     TST331
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                   ;                   CONDITIONAL BRANCH INST. AND    <====
                                                                   ;                   REPLACE THE MOVE INSTRUCTION    <====
                                                                   ;                   WHICH FOLLOWS W/ 702            <====
      033364  012742  000767                   MOV     #767,-(R2)  ;MOVE TO MAILBOX #  *******  767  *******
      033370  005242                           INC     -(R2)       ;SET MSGTYP TO FATAL ERROR
      033372  000000                           HALT                ;SUB -1 FROM -1 FAILED TO GIVE ZERO RESULT
                                                                   ;  OR SEQUENCE ERROR
 4470                                 ;**************************************************************************************
                                      ;TEST 331          TEST RTI  KERNAL/USER  MODE MICRO FLOW
                                      ;**************************************************************************************
      033374  005212                  TST331:  INC     (R2)        ;UPDATE TEST NUMBER
      033376  022712  000331                   CMP     #331,(R2)   ;SEQUENCE ERROR?
      033402  001037                           BNE     TST332-10   ;BR TO ERROR HALT ON SEQ ERROR
 4471 033404  012706  001000                   MOV     #STBOT,R6   ;SETUP KERNAL STACK
 4472 033410  012767  140000  144360           MOV     #USRM,PS    ;SETUP USER MODE
 4473 033416  012706  036370                   MOV     #USTBOT,R6  ;SETUP USER  STACK POINTER
 4474 033422  012746  140000                   MOV     #USRM,-(SP) ;PUSH USER R6 ON STACK
 4475 033426  012746  033434                   MOV     #REN,-(SP)  ;SETUP RETURN ADDRESS
 4476 033432  000002                           RTI
 4477 033434  022767  140000  144334  REN:     CMP     #140000,PS  ;CHECK PSW
 4478 033442  001407                           BEQ     1$
 4479 033444  042767  140000  144324           BIC     #USRM,PS    ;CLEAR USER MODE
 4480 033452  012742  000770                   MOV     #770,-(R2)  ;MOVE TO MAILBOX #  *******  770  *******
      033456  005242                           INC     -(R2)       ;SET MSGTYP TO FATAL ERROR
      033460  000000                           HALT                ;USER MODE DID NOT SET
 4481 033462  042767  140000  144306  1$:      BIC     #USRM,PS    ;SET KERNAL MODE
 4482 033470  012746  000340                   MOV     #340,-(SP)  ;SET LEVEL 7
 4483 033474  012746  033512                   MOV     #TST332,-(SP)
 4484 033500  000002                           RTI
 4485 033502  012742  000771                   MOV     #771,-(R2)  ;MOVE TO MAILBOX #  *******  771  *******
      033506  005242                           INC     -(R2)       ;SET MSGTYP TO FATAL ERROR
      033510  000000                           HALT                ;RTI DID NOT HAPPEN
 4486
 4487                                          ;*********************************************************************
 4488                                 ;*       THIS TEST IS OPTIONAL AND IS SELECTED BY SETTING MFM HARDWARE
 4489                                 ;*       SWITCH REGISTER BIT 08 TO A 1 IN THE CASE OF STANDALONE OPERATION
 4490                                 ;*       OF THE DIAGNOSTIC. IN THE CASE OF MANUFACTURING APT RUNTIME MODE
 4491                                 ;*       THEN BIT 08 OF $SWREG IS SET TO 1 THRU APT SCRIPTING.
```

```

                                        ;*      TEST DESCRIPTION:
                                        ;*      THIS TEST VERIFIES THAT THE SWITCH REGISTER SELECT SIGNAL IS
                                        ;*      ISSUED FROM THE CPU DATA PATH MODULE TO THE MFM MODULE.  WHEN
                                        ;*      THE HARDWARE SWITCH REGISTER IS READ, THE ADDRESS OF THE SWITCH
                                        ;*      REGISTER IS DECODED ON THE CPU DATA PATH CAUSING THE 'SR SELECT'
                                        ;*      SIGNAL TO BE ISSUED TO THE MFM. THE MFM USES THIS SIGNAL TO PLACE
                                        ;*      THE REGISTER CONTENTS ONTO THE PAX DATA BUS. CONTENTS OF THE SWITCH
                                        ;*      REGISTER OTHER THAN ALL 1'S SHOULD BE READ.(THERE IS A
                                        ;*      HI PROBABILITY THAT IF THE 'SR SELECT' SIGNAL IS NOT ISSUED
                                        ;*      ALL 1'S WILL BE READ ON PAX DATA.) IT IS ASSUMED THAT DATA OTHER
                                        ;*      THAN ALL 1'S IS LOCATED IN HARDWARE SWITCH REGISTER .

                                        ;*************************************************************************
                                        ;TEST 332       SWITCH REGISTER SELECT TEST
                                        ;*************************************************************************
 033512  005212                         TST332: INC     (R2)            ;UPDATE TEST NUMBER
 033514  022712  000332                         CMP     #332,(R2)       ;SEQUENCE ERROR?
 033520  001022                                 BNE     TST333-10       ;BR TO ERROR HALT ON SEQ ERROR

 033522  132767  000200  144571                 BITB    #200,$ENVM      ;IS APT SIZING?
 033530  001405                                 BEQ     4$              ;NO;TRY HARDWARE SWITCH REGISTER
 033532  032767  000400  144562                 BIT     #400,$SWREG     ;YES APT IS SIZING;DOES APT SAY TO DO
                                                                        ;THIS TEST
 033540  001413                                 BEQ     10$             ;NO;SKIP TEST
 033542  000404                                 BR      1$              ;YES,DO TEST
 033544  032737  000400  177570 4$:             BIT     #400,@#177570   ;DOES HARDWARE SWITCH REGISTER SAY TO
                                                                        ;TO DO TEST?
 033552  001406                                 BEQ 10$                 ;NO,SKIP TEST

 033554  013700  177570         1$:             MOV     @#177570,R0     ;READ HARDWARE SWITCH REGISTER CONTENTS
                                                                        ;AND SAVE IN R0
 033560  022700  177777                         CMP     #-1,R0          ;WERE ALL 1'S RECEIVED
 033564  001001                                 BNE 10$                 ;NO,TEST PASSES
 033566  000000                                 HALT                    ;'SR SELECT' ERROR OR SEQUENCE ERROR
                                                                        ;ALL 1'S WERE RECEIVED WHEN HARDWARE SWITCH
                                                                        ;REGISTER WAS READ. THIS INDICATES THAT THE
                                                                        ;THE SWITCH REGISTER CONTENTS WAS NOT PUT ON
                                                                        ;THE PAX DATA LINES AS A RESULT OF THE 'SR SELECT'
                                                                        ;SIGNAL BEING RECEIVED BY THE MFM FROM THE
                                                                        ;CPU DATA PATH MODULE
 033570  000240                 10$:            NOP                     ;END OF TEST
 033572  000240                                 NOP
 033574  000240                                 NOP



                                                ;*****************************************************************
                                        ;*      THIS TEST IS OPTIONAL AND IS SELECTED BY SETTING MFM HARDWARE
                                        ;*      SWITCH REGISTER BIT 08 TO A 1 IN THE CASE OF STANDALONE OPERATION
                                        ;*      OF THE DIAGNOSTIC. IN THE CASE OF MANUFACTURING APT RUNTIME MODE
                                        ;*      THEN BIT 08 OF $SWREG IS SET TO 1 THRU APT SCRIPTING.
                                        ;*
                                        ;*      THIS TEST VERIFIES THE CACHE RESTART SIGNAL ON THE CPU CONTROL
                                        ;*      MODULE ISSUED FROM  THE CACHE.
                                        ;*
                                        ;*      THIS TEST ASSUMES THAT ALL MODULES EXCEPT THE CPU DATA PATH/CONTROL
                                        ;*      STORE ARE KNOWN GOOD MODULES.



                                        ;*      THIS TEST TOGETHER WITH OTHER CACHE TESTS,ALLOW MFG. TO ELIMINATE
                                        ;*      HAVING TO RUN THE CACHE DIAGNOSTIC DURING QUICK
                                        ;*      VERIFY TESTING  OF THE CPU MODULE.
                                        ;*      TEST DESCRIPTION:
                                        ;*      VERIFY THAT A CACHE READ HIT WILL RESULT IN DATA BEING READ
                                        ;*      FROM CACHE DATA STORE, ASSURING THAT THE CACHE HAS ISSUED A
                                        ;*      A CPU CLOCK RESTART SIGNAL.  ASSURE THAT ALL 0'S CAN BE CACHED
                                        ;*      OUT OF CACHE DATA STORE.
                                        ;*
                                        ;*******************************************************************************
                                        ;TEST 333        CACHE RESTART SIGNAL TEST
                                        ;*******************************************************************************
033576  005212                          TST333: INC     (R2)                    ;UPDATE TEST NUMBER
033600  022712  000333                          CMP     #333,(R2)               ;SEQUENCE ERROR?
033604  001115                                  BNE     TST334-10               ;BR TO ERROR HALT ON SEQ ERROR
033606  132767  000200  144505                  BITB    #200,$ENVM              ;IS APT SIZING?
033614  001405                                  BEQ     4$                      ;NO;TRY HARDWARE SWITCH REGISTER
033616  032767  000400  144476                  BIT     #400,$SWREG             ;YES APT IS SIZING;DOES APT SAY TO DO
                                                                                ;THIS TEST
033624  001506                                  BEQ     10$                     ;NO;SKIP TEST
033626  000404                                  BR      1$                      ;YES,DO TEST
033630  032737  000400  177570          4$:     BIT     #400,@#177570           ;DOES HARDWARE SWITCH REGISTER SAY TO
                                                                                ;TO DO TEST?
033636  001501                                  BEQ 10$                         ;NO,SKIP TEST

033640                                  1$:

033640  012701  040000                          MOV      #40000,R1              ;ADDRESS 40000 TO R1
033644  012705  060000                          MOV      #60000,R5              ;ADDRESS 60000 TO R5
033650  012737  033734  000014                  MOV      #3$,@#14               ;SETUP BPT TRAP VECTORS
033656  012737  000340  000016                  MOV      #340,@#16
033664  005003                                  CLR     R3                      ;CLEAR ERROR FLAGS
033666  005004                                  CLR     R4
033670  012706  060002                          MOV      #60002,R6              ;STACK POINTER NOW POINTS TO ADDRESS 60002
033674  005037  060000                          CLR     @#60000                 ;PRECONDITION MAIN MEMORY ADDRESS LOCATION
                                                                                ;60000 WITH ALL 0'S
033700  012767  000340  144070                  MOV     #340,PS                 ;PRECONDITION PS TO 340
033706  112737  000002  177750                  MOVB    #2,@#177750             ;'HIT ON DESTINATION ONLY'(HODO)  ALLOWS
                                                                                ;CACHE  UPDATES AND HITS
                                                                                ;ONLY DURING THE DESTINATION MEMORY ACCESS
                                                                                ;OF AN INSTRUCTION.
033714  012737  000011  177746                  MOV      #11,@#177746           ;NO BYPASS TO ALLOW WRITES TO CACHE STORES.
                                                                                ;ENABLE LOW CACHE
033722  000257                                  CCC                             ;CLEAR ALL CONDITION CODES
033724  005711                                  TST      (R1)                   ;
033726  005715                                  TST      (R5)                   ;CACHE READ UPDATE. WRITE ALL 0'S FROM
                                                                                ;MAIN MEMORY LOCATION TO CACHE DATA STORE
                                                                                ;LOCATION 0000.
033730  000003                                  BPT                             ;BREAKPOINT TRAP. DUE TO A TRAP,THE  PSW
                                                                                ;WILL BE WRITTEN TO THE STACK, WHICH NOW
                                                                                ;POINTS TO ADDRESS 60000.THE TRAP INSTRUCTION
                                                                                ;IS A NON-DESTINATION ACCESS INSTR.THEREFORE,
                                                                                ;SINCE HODO IS BEING USED, A CACHE UPDATE
                                                                                ;WILL BE INHIBITED. MAIN MEMORY
                                                                                ;ADDRESS 60000 WILL CONTAIN PSW  DATA OF 344,AND
```

```
                                                                ;THE LOCATION IN CACHE CORRESPONDING TO ADDRESS
                                                                ;60000 WILL BE LEFT WITH ALL 0'S DATA.

033732  000000                          HALT                    ;BPT TRAP DID NOT OCCUR

033734  042737  000002  177750  3$:     BIC     #2,@#177750     ;TRAP TO HERE;DISABLE HODO
033742  011500                          MOV     (R5),R0         ; WHEN THIS INSTRUCTION READS
                                                                ;ADDRESS 60000
                                                                ;A CACHE READ HIT SHOULD RESULT AND A CPU CLOCK
                                                                ;RESTART SIGNAL SHOULD BE ISSUED.
                                                                ;THE CPU SHOULD READ DATA FROM CACHE DATA STORE
                                                                ;RATHER THAN MAIN MEMORY.
033744  000240                          NOP
033746  000240                          NOP
033750  005700                          TST     R0              ;R0 SHOULD CONTAIN ALL 0'S
033752  001406                          BEQ     7$              ;
033754  022700  000344                  CMP     #344,R0         ;DID THE CPU READ MAIN MEMORY?
033760  001002                          BNE     6$              ;NO,MUST HAVE READ CACHE BUT BAD DATA WAS RECEIVED.
033762  005203                          INC     R3              ;INDICATE ERROR THAT MAIN MEMORY WAS READ
033764  000401                          BR      7$
033766  005204                  6$:     INC     R4              ;INDICATE ERROR THAT DATA WAS CACHED BUT
                                                                ;BAD DATA WAS RECEIVED.
033770  105037  177750          7$:     CLRB    @#177750        ;DISABLE MAINTENANCE MODE
033774  012737  000000  177746          MOV     #0,@#177746     ;TURN ON CACHE
034002  012706  001000                  MOV     #STBOT,R6       ;RESET STACK POINTER
034006  012737  036410  000014          MOV     #T014,@#14      ;RESTORE BPT VECTORS
034014  005037  000016                  CLR     @#16
034020  005703                          TST     R3              ;WAS MAIN MEMORY READ?
034022  001402                          BEQ     8$              ;NO
034024  000000                          HALT                    ;ERROR
                                                                ;CPU CLOCK RESTART-CACHED DATA TESTS

                                                                ;ATTEMPTING TO CAUSE A READ HIT IN ORDER TO
                                                                ;CACHE DATA RESULTED IN MAIN MEMORY BEING READ
034026  000405                          BR      10$             ;NEXT TEST
034030  005704                  8$:     TST     R4              ;WAS BAD DATA CACHED FROM CACHE DATA STORE?
034032  001403                          BEQ     10$             ;NO, NEXT TEST
034034  000000                          HALT                    ;ERROR
                                                                ;CPU CLOCK RESTART-CACHED DATA TESTS

                                                                ;CREATING A READ HIT BY READING ADDRESS 60000
                                                                ;CACHED BAD DATA FROM CACHE DATA STORE
034036  000401                          BR      10$
034040  000000                          HALT                    ;SEQUENCE ERROR
034042  000402                  10$:    BR      .+6
034044  000240                          NOP
034046  000240                          NOP

                                        ;***************************************************************
                                ;*      THIS TEST IS OPTIONAL AND IS SELECTED BY SETTING MFM HARDWARE
                                ;*      SWITCH REGISTER BIT 08 TO A 1 IN THE CASE OF STANDALONE OPERATION
                                ;*      OF THE DIAGNOSTIC. IN THE CASE OF MANUFACTURING APT RUNTIME MODE
                                ;*      THEN BIT 08 OF $SWREG IS SET TO 1 THRU APT SCRIPTING.
                                ;*
                                ;*      THIS TEST VERIFIES
                                ;*      THE CPU CONTROL SIGNAL TO THE CACHE WHICH INDICATES THAT AN ACCESS
                                ;*      TO THE UNIBUS IS BEING PERFORMED(PA TOP 128K L).
```

```
                                              ;*
                                              ;*      THIS TEST ASSUMES THAT ALL MODULES OTHER THAN CPU CONTROL/DATA PATH
                                              ;*      ARE KNOWN GOOD MODULES.

                                              ;*      THIS TEST TOGETHER WITH OTHER CACHE TESTS,ALLOW MFG. TO ELIMINATE
                                              ;*      HAVING TO RUN THE CACHE DIAGNOSTIC DURING QUICK
                                              ;*      VERIFY TESTING  OF THE CPU MODULE.
                                              ;*      TEST DESCRIPTION:
                                              ;*      VERIFY THAT THE CACHE WRITE CONTROL LOGIC WILL INHIBIT A CACHE
                                              ;*      READ UPDATE TO CACHE TAG STORE DUE TO AN ACCESS TO I/O PAGE.
                                              ;*
                                              ;*************************************************************************
                                              ;TEST 334        CACHE WRITE CONTROL LOGIC TEST
                                              ;*************************************************************************
 034050  005212                               TST334: INC     (R2)            ;UPDATE TEST NUMBER
 034052  022712  000334                               CMP     #334,(R2)       ;SEQUENCE ERROR?
 034056  001051                                       BNE     TST335-10       ;BR TO ERROR HALT ON SEQ ERROR
 034060  132767  000200  144233                       BITB    #200,$ENVM      ;IS APT SIZING?
 034066  001405                                       BEQ     4$              ;NO;TRY HARDWARE SWITCH REGISTER
 034070  032767  000400  144224                       BIT     #400,$SWREG     ;YES APT IS SIZING;DOES APT SAY TO DO
                                                                              ;THIS TEST
 034076  001442                                       BEQ     10$             ;NO;SKIP TEST
 034100  000404                                       BR      1$              ;YES,DO TEST
 034102  032737  000400  177570       4$:             BIT     #400,@#177570   ;DOES HARDWARE SWITCH REGISTER SAY TO
                                                                              ;TO DO TEST?
 034110  001435                                       BEQ 10$                 ;NO,SKIP TEST

 034112                               1$:
 034112  112737  000002  177750                               MOVB #2,@#177750        ;ALLOWS CACHE TAG FIELD BITS TO BE
                                                                                      ;WRITTEN TO CHR<15:07> ONLY DURING
                                                                                      ;THE DESTINATION MEMORY ACCESS
                                                                                      ;OF AN INSTRUCTION
 034120  012737  000015  177746                               MOV #15,@#177746        ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
 034126  005737  057744                                       TST @#57744
 034132  005737  077744                                       TST @#77744             ;READ UPDATE;LOAD BIT PATTERN
                                                                                      ;000000011 INTO TAG STORE LOCATION
                                                                                      ;7762
 034136  005737  177744                                       TST @#177744            ;ACCESS I/O PAGE BY READING CME REGISTER.
                                                                                      ;THE CACHE COULD DO AN UPDATE TO
                                                                                      ;TAG STORE LOCATION 7762 BUT THE ACCESS
                                                                                      ;TO I/O PAGE WILL INHIBIT WRITE CONTROL
                                                                                      ;LOGIC
 03 142  005737  057744                                       TST @#57744             ;WRITE TAG STORE DATA FROM  LOCATION
                                                                                      ;7762 INTO CHR<15:07>.
 034146  013700  177752                                       MOV @#177752,R0         ;SAVE CHR DATA
 034152  000240                                               NOP
 034154  000240                                               NOP

 034156  105037  177750                                       CLRB @#177750           ;DISABLE MAINTENANCE MODE
 034162  012737  000000  177746                               MOV #0,@#177746         ;TURN ON CACHE
 034170  042700  000177                                       BIC #177,R0             ;PREPARE R0 FOR ERROR CHECK
 034174  022700  000600                                       CMP #600,R0             ;BITS 15:07 SHOULD BE BIT PATTERN 000000011
 034200  001401                                               BEQ 10$                 ;PASS
 034202  000000                                               HALT                    ;CACHE WRITE CONTROL CPU  LOGIC SIGNAL
                                                                                      ;OR SEQUENCE ERROR
                                                                                      ;READING TAG DATA BITS<21:13> THRU CACHE HIT REGISTE
                                                                                      ;DID NOT RESULT IN BIT PATTERN 000000011.
```

```
                                                                   ;THIS INDICATES THAT A READ UPDATE
                                                                   ;MAY HAVE OCCURED TO CACHE TAG STORE
                                                                   ;DUE TO AN ACCESS TO I/O PAGE
                                                                   ;RO BITS 15:07 CONTAINS DATA RECEIVED
                                                                   ;FROM CACHE HIT REGISTER BITS 15:07
034204  000240                          10$:    NOP            ;END OF TEST
034206  000240                                  NOP
034210  000240                                  NOP
                                        ;*************************************************************
                                ;*      THIS TEST IS OPTIONAL AND IS SELECTED BY SETTING MFM HARDWARE
                                ;*      SWITCH REGISTER BIT 08 TO A 1 IN THE CASE OF STANDALONE OPERATION
                                ;*      OF THE DIAGNOSTIC. IN THE CASE OF MANUFACTURING APT RUNTIME MODE
                                ;*      THEN BIT 08 OF $SWREG IS SET TO 1 THRU APT SCRIPTING.

                                ;*      THIS TEST VERIFIES
                                ;*      THE CACHE BYPASS SIGNAL GENERATED FROM THE CPU TO THE CACHE(CACHE BYPASS L).
                                ;*      THIS SIGNAL IS GENERATED WHEN THE ASRB INSTRUCTION IS EXECUTED.
                                ;*

                                ;*      THIS TEST ASSUMES THAT ALL MODULES EXCEPT CPU DATA PATH/CONTROL STORE
                                ;*      ARE KNOWN GOOD MODULES.

                                ;*      THIS TEST TOGETHER WITH OTHER CACHE TESTS,ALLOW MFG. TO ELIMINATE
```

```
                                                  ;*      HAVING TO RUN THE CACHE DIAGNOSTIC DURING QUICK
                                                  ;*      VERIFY TESTING  OF THE CPU MODULE.
                                                  ;*      TEST DESCRIPTION:
                                                  ;*      VERIFY THAT THE ASRB INSTRUCTION WILL CAUSE A CACHE BYPASS
                                                  ;*      UNDER A READ HIT CONDITION.
                                                  ;*
                                                  ;*******************************************************************************
                                                  ;TEST 335        ASRB CACHE BYPASS TEST
                                                  ;*******************************************************************************
     034212  005212                               TST335: INC     (R2)            ;UPDATE TEST NUMBER
     034214  022712  000335                               CMP     #335,(R2)       ;SEQUENCE ERROR?
     034220  001043                                       BNE     TST336-10       ;BR TO ERROR HALT ON SEQ ERROR
     034222  132767  000200  144071                       BITB    #200,$ENVM      ;IS APT SIZING?
     034230  001405                                       BEQ     4$              ;NO;TRY HARDWARE SWITCH REGISTER
     034232  032767  000400  144062                       BIT     #400,$SWREG     ;YES APT IS SIZING;DOES APT SAY TO DO
                                                                                  ;THIS TEST
     034240  001434                                       BEQ     10$             ;NO;SKIP TEST
     034242  000404                                       BR      1$              ;YES,DO TEST
     034244  032737  000400  177570  4$:                  BIT     #400,@#177570   ;DOES HARDWARE SWITCH REGISTER SAY TO
                                                                                  ;TO DO TEST?
     034252  001427                                       BEQ 10$                 ;NO,SKIP TEST

     034254                              1$:
     034254  012700  060000                                       MOV #60000,R0           ;SETUP TEST LOCATION ADDRESS
                                                                                          ;IN R0
     034260  112737  000002  177750                               MOVB #2,@#177750        ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AN
                                                                                          ;CLOCKING OF OUTPUT OF CACHE HIT NAND
                                                                                          ;GATE INTO CMR ONLY DURING THE DESTINATION
                                                                                          ;ACCESS OF AN INSTRUCTION.
     034266  012737  000011  177746                               MOV #11,@#177746        ;NO UCB SO AS TO WRITE CACHE STORES
                                                                                          ;ENABLE LOW CACHE FOR A READ HIT
```

```

 034274  005710                          TST (R0)                 ;READING LOCATION SPECIFIED BY R0
                                                                   ;WILL ASSURE A READ HIT WHEN THE
                                                                   ;LOCATION IS READ AGAIN
 034276  106210                          ASRB (R0)                ;ASRB INSTRUCTION WILL CAUSE A BYPASS
```

```
                                                                        ;TO OCCUR INHIBITING A READ HIT
                                                                        ;TO LOCATION SPECIFIED BY R0.
                                                                        ;THIS SITUATION WILL RESULT IN CMR
                                                                        ;BIT 8 BEING A 1.

 034300  013701  177750                           MOV @#177750,R1       ;SAVE CMR CONTENTS
 034304  000240                                   NOP
 034306  000240                                   NOP
 034310  105037  177750                           CLRB @#177750         ;DISABLE MAINT MODE
 034314  012737  000000  177746                   MOV #0,@#177746       ;TURN ON CACHE
 034322  032701  000400                           BIT #400,R1           ;WAS CMR BIT 8 A 1
 034326  001001                                   BNE 10$               ;PASS
 034330  000000                                   HALT                  ;CACHE BYPASS DID NOT OCCUR OR
                                                                        ;SEQUENCE ERROR
                                                                        ;READING OUTPUT OF CACHE HIT NAND GATE
                                                                        ;THRU CMR<8> DID NOT RESULT IN A 1
```

```
034332  000240                                   10$:    NOP                     ;END OF TEST
034334  000240                                           NOP
034336  000240                                           NOP


                                                 ;*******************************************************************
                                         ;*      THIS TEST IS OPTIONAL AND IS SELECTED BY SETTING MFM HARDWARE
                                         ;*      SWITCH REGISTER BIT 08 TO A 1 IN THE CASE OF STANDALONE OPERATION
                                         ;*      OF THE DIAGNOSTIC. IN THE CASE OF MANUFACTURING APT RUNTIME MODE
                                         ;*      THEN BIT 08 OF $SWREG IS SET TO 1 THRU APT SCRIPTING.

                                         ;*      THIS TEST VERIFIES THE MICROCODE IN THE CPU CONTROL STORE ASSOCIATED
                                         ;*      WITH THE CIS INSTRUCTION SET. IT IS ASSUMED THAT ALL MODULES EXCEPT
                                         ;*      THE CPU DATA PATH AND CONTROL MODULE ARE ALL 'KNOWN GOOD MODULES'.
                                         ;*
                                         ;*      THIS TEST ALLOWS MFG. TO ELIMINATE
                                         ;*      HAVING TO RUN THE CIS DIAGNOSTIC DURING QUICK
                                         ;*      VERIFY TESTING  OF THE CPU MODULE.

                                         ;*      TEST DESCRIPTION:
                                         ;*      THE CPU MPC MICROADDRESSES ASSOCIATED WITH THE CPU ARE
                                         ;*      740 THRU 776. IT HAS BEEN DETERMINED THAT BY EXECUTING THIS TEST
                                         ;*      ALL BUT MPC ADDRESS 772 AND 773 ARE COVERED.

                                         ;***********************************************************************************
                                         ;TEST 336        CIS CPU MPC ADDRESS COVERAGE TEST
                                         ;***********************************************************************************
034340  005212                           TST336: INC     (R2)            ;UPDATE TEST NUMBER
034342  022712  000336                           CMP     #336,(R2)       ;SEQUENCE ERROR?
034346  001101                                   BNE     TST337-10       ;BR TO ERROR HALT ON SEQ ERROR
034350  132767  000200  143743                   BITB    #200,$ENVM      ;IS APT SIZING?
034356  001405                                   BEQ     4$              ;NO;TRY HARDWARE SWITCH REGISTER
034360  032767  000400  143734                   BIT     #400,$SWREG     ;YES APT IS SIZING;DOES APT SAY TO DO
                                                                         ;THIS TEST
034366  001472                                   BEQ     ENDMPC          ;NO;SKIP TEST
034370  000404                                   BR      1$              ;YES,DO TEST
034372  032737  000400  177570  4$:      BIT     #400,@#177570   ;DOES HARDWARE SWITCH REGISTER SAY TO
                                                                         ;TO DO TEST?
034400  001465                                   BEQ     ENDMPC          ;NO,SKIP TEST

034402  012737  034440  000010  1$:      MOV     #2$,@#10                        ;SETUP FOR POSSIBLE TRAP
034410  012737  000340  000012           MOV     #340,@#12
034416  076001                                   76001                   ;THIS CIS INSTRUCTION   SHOULD CAUSE A TRAP
                                                                         ;TO OCCUR TO VECTOR 10 INDICATING THAT
                                                                         ;SWITCH S1 OF CIS M7092 DATA PATH MODULE
                                                                         ;IS OPEN. THE SWITCH MUST BE OPEN TO ALLOW
                                                                         ;THIS TEST TO RUN.
034420  000240                                   NOP
034422  012737  036400  000010                   MOV     #T010,@#10      ;RESTORE VECTORS
034430  005037  000012                           CLR     @#12
034434  000000                                   HALT                    ;CHECK TO SEE THAT SWITCH S1 OF M7092 CIS DATA
                                                                         ;PATH MODULE IS OPEN.

034436  000406                                   BR      5$
034440  022626                           2$:     CMP     (SP)+,(SP)+     ;READJUST STACK
034442  012737  036400  000010                   MOV     #T010,@#10      ;RESTORE VECTORS
034450  005037  000012                           CLR     @#12
```

```

034454  076150                          5$:     ADDNI                   ;;NOW PERFORM CIS INSTRUCTION WHICH WILL
                                                                        ;COVER MOST OF THE CPU MPC MICROADDRESSES
034456  034466                                  .WORD   A
034460  034472                                  .WORD   B
034462  034476                                  .WORD   D

034464  000414                                  BR      CHECK           ;NOW CHECK RESULTS

        076150                                  ADDNI=76150
034466  000006                          A:      .WORD   6
034470  034502                                  .WORD   SA
034472  000006                          B:      .WORD   6
034474  034502                                  .WORD   SA
034476  000006                          D:      .WORD   6
034500  034510                                  .WORD   DA
034502  001002                          SA:     .WORD   1002
034504  001002                                  .WORD   1002
034506  031002                                  .WORD   31002
034510  000000                          DA:     .WORD   0
034512  000000                                  .WORD   0
034514  000000                                  .WORD   0

034516                                  CHECK:
034516  022737  032064  034510                  CMP     #32064,@#DA     ;CHECK RESULTS
034524  001401                                  BEQ     6$              ;PASS
034526  000000                                  HALT                    ;ERROR
034530  022737  032064  034512  6$:             CMP     #32064,@#DA+2   ;CHECK RESULT
034536  001401                                  BEQ     7$              ;PASS
034540  000000                                  HALT                    ;ERROR
034542  022737  032064  034514  7$:             CMP     #32064,@#DA+4   ;CHECK RESULT
034550  001401                                  BEQ     ENDMPC          ;PASS
034552  000000                                  HALT                    ;CIS INSTUCTION OR SEQUENCE ERROR

034554  000240                          ENDMPC: NOP
034556  000240                                  NOP
034560  000240                                  NOP

                                        ;===============================================================
                                        ;
                                        ;                               WARNING!
                                        ;
                                        ;       THE FOLLOWING CIS ABORT TEST MUST BE LOCATED BELOW
                                        ;       MEMORY LOCATION 40000 DUE TO THE MEMORY MANAGEMENT
                                        ;       SETUP REQUIRED IN THE TEST.
                                        ;
                                        ;       ALSO THE TEST DESTROYS THE CONTENTS OF MEMORY IN THE
                                        ;       FOLLOWING RANGES:
                                        ;
                                        ;               57670-60070
                                        ;               76000-76001
                                        ;
                                        ;       THIS WARNING IS PRIMARILY AIMED AT FUTURE MODIFIERS OF THIS CPU DIAGNOSTIC.
                                        ;
                                        ;===============================================================




                                        ;************************************************************************
                                        ;
                                        ;CIS STACK 'PROBE AHEAD'' MEMORY MANAGEMENT ABORT TESTS
                                        ;
                                        ;       THE NEXT THREE SUBTESTS ARE AIMED AT TESTING THE KT
                                        ;       PAGE FAULT ROM (SCHEMATIC PAGE K1-8) AND ASSOCIATED LOGIC.
                                        ;       NOTE: THESE 3 SUBTESTS ARE OPTIONAL AND ARE SELECTED BY SETTING MFM
                                        ;       HARDWARE SWITCH REGISTER BIT 08 TO A 1 IN THE CASE OF
                                        ;       STANDALONE OPERATION OF THE DIAGNOSTIC.  IN THE CASE OF
                                        ;       MANUFACTURING APT RUNTIME MODE THEN BIT 08 OF $SWREG IS SET TO 1
                                        ;       THRU APT SCRIPTING.
                                        ;
                                        ;       EACH OF THESE 3 SUBTESTS SETUP THE STACK POINTER SUCH THAT
                                        ;       WHEN THE CIS PROCESSOR CHECKS TO SEE IF THERE IS ENOUGH
                                        ;       SPACE ON THE STACK (200 BYTES) THE ANSWER FOUND SHOULD BE
                                        ;       NO BECAUSE A PORTION OF THE STACK IS IN PROTECTED MEMORY.
                                        ;
                                        ;       EACH OF THESE 3 SUBTESTS VERIFY THAT THE CIS INSTRUCTION ABORTS
                                        ;       UNDER SEVERAL CONDITIONS OF MEMORY MANAGEMENT PAGE PROTECTION.
                                        ;       ALL OF THE PAGE PROTECTION DATA IS LISTED IN TABLE 'PDRTAB'.
                                        ;
                                        ;       THIS  TEST ALLOWS MFG. TO  ELIMINATE
                                        ;       HAVING TO RUN THE CIS DIAGNOSTIC DURING QUICK
                                        ;       VERIFY TESTING OF THE CPU MODULE.
                                        ;

        000377                          FILL=377
        076130                          MOVCI=76130

                                        .SBTTL  CIS STACK PROBE AHEAD MEM MGMT ABORT TEST
                                        ;******************************************************************************
                                        ;TEST 337        CIS STACK PROBE AHEAD MEM MGMT ABORT TEST
                                        ;******************************************************************************

034562  005212                          TST337: INC (R2)                ;UPDATE TEST NUMBER
034564  022712  000337                          CMP #337,(R2)           ;SEQUENCE ERROR?
034570  001020                                  BNE 6$                  ;BR TO ERROR HALT ON SEQ ERROR

034572  132767  000200  143521                  BITB #200,$ENVM         ;IS APT SIZING?
034600  001405                                  BEQ 4$                  ;NO; TRY HARDWARE SWITCH REGISTER
034602  032767  000400  143512                  BIT #400,$SWREG         ;YES APT IS SIZING; DOES APT SAY TO DO THIS TEST
034610  001406                                  BEQ 5$                  ;NO ; SKIP TEST
034612  000411                                  BR 1$                   ;YES, DO TEST
034614  032737  000400  177570  4$:             BIT #400,@#177570       ;DOES HARDWARE SWITCH REGISTER SAY TO DO TEST?
034622  001401                                  BEQ 5$                  ;NO, SKIP TEST
034624  000404                                  BR 1$                   ;YES, DO TEST
034626  000167  001100          5$:             JMP ENDABO
034632  000167  001072          6$:             JMP ENDPASS-10

                                        ;SETUP PAR'S FOR DIRECT MAPPING
                                        ;
034636  005037  172516          1$:             CLR @#MMR3              ;CLEAR OUT D-SPACE ENABLES
034642  010667  001022                          MOV SP,STK1             ;SAVE THE STACK POINTER

034646  012737  000000  172340                  MOV #0,@#KIPAR0         ;SETUP KERNEL I-SPACE PAR'S
```

```
034654  012737  000200  172342           MOV #200,@#KIPAR1
034662  012737  000400  172344           MOV #400,@#KIPAR2
034670  012737  000600  172346           MOV #600,@#KIPAR3
034676  012737  001000  172350           MOV #1000,@#KIPAR4
034704  012737  001200  172352           MOV #1200,@#KIPAR5
034712  012737  001400  172354           MOV #1400,@#KIPAR6
034720  012737  177600  172356           MOV #177600,@#KIPAR7

034726  012737  000000  172240           MOV #0,@#SIPAR0          ;SETUP SUPERVISOR I-SPACE PAR'S
034734  012737  000200  172242           MOV #200,@#SIPAR1
034742  012737  000400  172244           MOV #400,@#SIPAR2
034750  012737  000600  172246           MOV #600,@#SIPAR3
034756  012737  001000  172250           MOV #1000,@#SIPAR4
034764  012737  001200  172252           MOV #1200,@#SIPAR5
034772  012737  001400  172254           MOV #1400,@#SIPAR6
035000  012737  177600  172256           MOV #177600,@#SIPAR7

035006  012737  000000  177640           MOV #0,@#UIPAR0          ;SETUP USER I-SPACE PAR'S
035014  012737  000200  177642           MOV #200,@#UIPAR1
035022  012737  000400  177644           MOV #400,@#UIPAR2
035030  012737  000600  177646           MOV #600,@#UIPAR3
035036  012737  001000  177650           MOV #1000,@#UIPAR4
035044  012737  001200  177652           MOV #1200,@#UIPAR5
035052  012737  001400  177654           MOV #1400,@#UIPAR6
035060  012737  177600  177656           MOV #177600,@#UIPAR7


                                 ;SETUP PDR'S FOR R/W ACCESS
                                 ;

035066                           SETPDR:
035066  012700  172300                   MOV #KIPDR0,R0
035072  012720  177406           1$:     MOV #177406,(R0)+
   4979 035076  020027  172316                     CMP R0,#KIPDR7
   4980 035102  101773                             BLOS 1$
   4981
   4982 035104  012700  172200                     MOV #SIPDR0,R0
   4983 035110  012720  177406          2$:        MOV #177406,(R0)+
   4984 035114  020027  172216                     CMP R0,#SIPDR7
   4985 035120  101773                             BLOS 2$
   4986
   4987 035122  012700  177600                     MOV #UIPDR0,R0
   4988 035126  012720  177406          3$:        MOV #177406,(R0)+
   4989 035132  020027  177616                     CMP R0,#UIPDR7
   4990 035136  101773                             BLOS 3$
   4991
   4992                                 ;KERNEL MODE CIS STACK PROBE AHEAD MEM MGMT ABORT SUBTEST
   4993                                 ;
   4994
   4995 035140                          KMTSTS:
   4996 035140  012737  035546  000250             MOV #MMHDLR,@#MMVEC                 ;SETUP MEM MGMT INTERRRUPT VECTOR
   4997 035146  012737  000340  000252             MOV #PR7,@#MMVEC+2
   4998 035154  012701  035224                     MOV #1$,R1                          ;SETUP INTR RETURN ADDRESS
   4999 035160  012700  035672                     MOV #PDRTAB,R0
   5000 035164  012706  060070                     MOV #60070,SP
   5001
   5002 035170  011037  172304          2$:        MOV (R0),@#KIPDR2                   ;PROTECT PART OF STACK
   5003 035174  012737  000001  177572             MOV #1,@#MMR0                       ;TURN ON MEMORY MGMT
   5004
   5005 035202  004767  000362                     JSR PC,SAVR                         ;SAVE REGISTERS
   5006
   5007 035206  076130                             MOVCI                               ;EXECUTE THE CIS INSTRUCTION
   5008 035210  035560                             SRC.PTR
   5009 035212  035564                             DST.PTR
   5010 035214  000377                             FILL
   5011 035216  000240                             NOP
   5012 035220  000240                             NOP
   5013 035222  000000                             HALT                                ;CIS INSTRUCTION SHOULD HAVE ABORTED BUT DIDN'T
   5014
   5015 035224  004767  000372          1$:        JSR PC,RESR                         ;RESTORE REGISTERS
   5016 035230  062700  000002                     ADD #2,R0                           ;UPDATE PROTECTION SCHEME TO NEXT TABLE CASE
   5017 035234  005710                             TST (R0)                            ;ANY CASES LEFT TO TRY?
   5018 035236  001354                             BNE 2$                              ;BRANCH IF YES
   5019
   5020 035240  005037  177572                     CLR @#MMR0                          ;NO - PREPARE TO EXIT TEST
   5021 035244  012737  177406  172304             MOV #177406,@#KIPDR2                ;RESTORE R/W ACCESS TO STACK AREA
   5022 035252  000400                             BR SMTSTS                           ;GO TO NEXT TEST
   5023
   5024
   5025                                 ;SUPERVISOR MODE CIS STACK PROBEAHEAD MEMORY MGMT ABORT SUBTEST
   5026                                 ;
   5027
   5028 035254                          SMTSTS:
   5029 035254  012737  035546  000250             MOV #MMHDLR,@#MMVEC                 ;SETUP MEM MGMT INTERRRUPT VECTOR
   5030 035262  012737  040340  000252             MOV #040340,@#MMVEC+2
   5031 035270  012701  035354                     MOV #1$,R1                          ;SETUP INTR RETURN ADDRESS
   5032 035274  012700  035672                     MOV #PDRTAB,R0
   5033 035300  012737  040340  177776             MOV #040340,@#PSW                   ;SWITCH TO SUPERVISOR MODE
   5034 035306  012706  060070                     MOV #60070,SP
   5035
```

```
035312  011037  172204          2$:     MOV (R0),@#SIPDR2          ;PROTECT PART OF STACK
035316  012737  000001  177572          MOV #1,@#MMR0              ;TURN ON MEMORY MGMT

035324  004767  000240                  JSR PC,SAVR                ;SAVE REGISTERS

035330  076130                          MOVCI                      ;EXECUTE THE CIS INSTRUCTION
035332  035560                          SRC.PTR
035334  035564                          DST.PTR
035336  000377                          FILL

035340  000240                          NOP
035342  000240                          NOP
035344  012737  000340  177776          MOV #340,@#PSW             ;SWITCH BACK TO KERNEL MODE BEFORE HALT
035352  000000                          HALT                       ;CIS INSTRUCTION SHOULD HAVE ABORTED BUT DIDN'T

035354  004767  000242          1$:     JSR PC,RESR                ;RESTOERE REGISTERS
035360  062700  000002                  ADD #2,R0                  ;UPDATE PROTECTION SCHEME TO NEXT TABLE CASE
035364  005710                          TST (R0)                   ;ANY CASES LEFT TO TRY?
035366  001351                          BNE 2$                     ;BRANCH IF YES

035370  005037  177572                  CLR @#MMR0                 ;NO - PREPARE TO EXIT TEST
035374  012737  177406  172204          MOV #177406,@#SIPDR2       ;RESTORE R/W ACCESS TO STACK AREA
035402  000400                          BR UMTSTS                  ;GO TO NEXT TEST


                                ;USER MODE CIS STACK PROBEAHEAD MEM MGMT ABORT SUBTEST
                                ;

035404                          UMTSTS:
035404  012737  035546  000250          MOV #MMHDLR,@#MMVEC        ;SETUP MEM MGMT INTERRRUPT VECTOR
035412  012737  140340  000252          MOV #140340,@#MMVEC+2
035420  012701  035504                  MOV #1$,R1                 ;SETUP INTR RETURN ADDRESS
035424  012700  035672                  MOV #PDRTAB,R0
035430  012737  140340  177776          MOV #140340,@#PSW          ;SWITCH TO USER MODE
035436  012706  060070                  MOV #60070,SP

035442  011037  177604          2$:     MOV (R0),@#UIPDR2          ;PROTECT PART OF STACK
035446  012737  000001  177572          MOV #1,@#MMR0              ;TURN ON MEMORY MGMT

035454  004767  000110                  JSR PC,SAVR                ;SAVE REGISTERS

035460  076130                          MOVCI                      ;EXECUTE THE CIS INSTRUCTION
035462  035560                          SRC.PTR
035464  035564                          DST.PTR
035466  000377                          FILL

035470  000240                          NOP
035472  000240                          NOP
035474  012737  000340  177776          MOV #340,@#PSW             ;SWITCH BACK TO KERNEL MODE BEFORE HALT
035502  000000                          HALT                       ;CIS INSTRUCTION SHOULD HAVE ABORTED BUT DIDN'T

035504  004767  000112          1$:     JSR PC,RESR                ;RESTORE REGISTERS
035510  062700  000002                  ADD #2,R0                  ;UPDATE PROTECTION SCHEME TO NEXT TABLE CASE
035514  005710                          TST (R0)                   ;ANY CASES LEFT TO TRY?
035516  001351                          BNE 2$                     ;BRANCH IF YES

035520  005037  177572                  CLR @#MMR0                 ;NO - PREPARE TO EXIT TEST
```

```
035524  012737  177406  177604                  MOV #177406,@#UIPDR2            ;RESTORE R/W ACCESS TO STACK AREA
035532  012737  000340  177776                  MOV #340,@#PSW                  ;SWITCH BACK TO KERNEL MODE
035540  016706  000124                          MOV STK1,SP                     ;RESTORE THE STACK POINTER
035544  000472                                  BR ENDABO                       ;GO TO NEXT TEST



                                        ;MEMORY MANAGEMENT TRAP HANDLER
                                        ;
035546                                  MMHDLR:
035546  005037  177572                          CLR @#MMR0                      ;TURN OFF MEM MGMT
035552  005726                                  TST (SP)+                       ;FIX UP STACK
035554  005726                                  TST (SP)+
035556  000111                                  JMP (R1)                        ;RETURN VIA R1



                                        ;CIS INSTRUCTION SOURCE AND DESTINATION DESCRIPTORS
                                        ;
035560  000001                          SRC.PTR:        .WORD 1
035562  076000                                          .WORD 76000
035564  000001                          DST.PTR:        .WORD 1
035566  076001                                          .WORD 76001

                                        ;SUBROUTINES
                                        ;
035570  010067  000060                  SAVR:   MOV R0,SVR0                     ;SAVE REGISTERS
035574  010167  000056                          MOV R1,SVR1
035600  010267  000054                          MOV R2,SVR2
035604  010367  000052                          MOV R3,SVR3
035610  010467  000050                          MOV R4,SVR4
035614  010567  000046                          MOV R5,SVR5
035620  000207                                  RTS PC

035622  016700  000026                  RESR:   MOV SVR0,R0                     ;RESTORE REGISTERS
035626  016701  000024                          MOV SVR1,R1
035632  016702  000022                          MOV SVR2,R2
035636  016703  000020                          MOV SVR3,R3
035642  016704  000016                          MOV SVR4,R4
035646  016705  000014                          MOV SVR5,R5
035652  000207                                  RTS PC

035654  000000                          SVR0:   .WORD 0
035656  000000                          SVR1:   .WORD 0
035660  000000                          SVR2:   .WORD 0
035662  000000                          SVR3:   .WORD 0
035664  000000                          SVR4:   .WORD 0
035666  000000                          SVR5:   .WORD 0

035670  000000                          STK1:   .WORD 0



                                        ;PROTECTION TABLE  (WORD FORMAT = PDR FORMAT)
035672                                  PDRTAB:
035672  177000                                  177000          ;ACF=00         ED=0  PLF=176
035674  177410                                  177410          ;ACF=00         ED=1  PLF=177
035676  177400                                  177400          ;ACF=00         ED=0  PLF=177
```

```
   5150 035700  100010                       100010          ;ACF=00         ED=1  PLF=0
   5151
   5152 035702  177002                       177002          ;ACF=01         ED=0  PLF=176
   5153 035704  177412                       177412          ;ACF=01         ED=1  PLF=177
   5154 035706  177402                       177402          ;ACF=01         ED=0  PLF=177
   5155 035710  100012                       100012          ;ACF=01         ED=1  PLF=0
   5156
   5157 035712  177004                       177004          ;ACF=10         ED=0  PLF=176
   5158 035714  177414                       177414          ;ACF=10         ED=1  PLF=177
   5159 035716  177404                       177404          ;ACF=10         ED=0  PLF=177
   5160 035720  100014                       100014          ;ACF=10         ED=i  PLF=0
   5161
   5162 035722  177006                       177006          ;ACF=11         ED=0  PLF=176
   5163 035724  177416                       177416          ;ACF=11         ED=1  PLF=177
   5164 035726  000000                       0
   5165
   5166
   5167 035730  000000                       HALT            ;TEST SEQUENCE ERROR
   5168 035732  000240              ENDABO:  NOP
   5169 035734  000240                       NOP
   5170 035736  000240                       NOP
   5171
```

```
5173                                            ;*****************************************************************************
5174                                            ;                       END OF PASS SEQUENCE
5175                                            ;*****************************************************************************
5176
5177 035740  005212                             ENDPASS:INC (R2)                   ;UPDATE TEST NUMBER
5178 035742  022712  000340                             CMP #340,(R2)              ;SEQUENCE ERROR?
5179 035746  001042                                     BNE EOP1                   ;BR TO ERROR HALT ON SEQ ERROR
5180 035750  005237  000306                             INC     @#$PASS
5181 035754  105267  000106                             INCB    PASSPT             ;SHOULD PRINT THIS PASS?
5182 035760  001033                                     BNE     GOAGIN             ;NO
5183 035762  132767  000040  142331                     BITB    #40,$ENVM          ;WILL APT ALLOW PRINTING?
5184 035770  001017                                     BNE     ACT                ;NO
5185 035772  023727  000042  036040                     CMP     @#42,#$ENDAD       ;UNDER ACT AUTO ACCEPT?
5186 036000  001413                                     BEQ     ACT                ;IF SO SKIP PRINTOUT
5187 036002  012700  036070                             MOV     #MSG,R0            ;GET MSG ADDR.
5188 036006  105737  177564                     WAIT:   TSTB    @#TPS              ;TTY READY
5189 036012  100375                                     BPL     WAIT               ;NO WAIT
5190 036014  121027  000377                             CMPB    (R0),#377          ;IS NEXT CHAR. THE TERMINATOR
5191 036020  001403                                     BEQ     ACT                ;YES THEN BR
5192 036022  112037  177566                             MOVB    (R0)+,@#TPB        ;PRINT CHARACTER
5193 036026  000767                                     BR      WAIT               ;NEXT IF NOT DONE.
5194 036030  013700  000042                     ACT:    MOV     @#42,R0            ;CHECK ACT
5195 036034  001405                                     BEQ     GOAGIN             ;KEEP GOING
5196 036036  000005                                     RESET
5197 036040  004710                             $ENDAD: JSR     PC,(R0)            ;ACT HOOKS
5198 036042  000240                                     NOP
5199 036044  000240                                     NOP
5200 036046  000240                                     NOP
5201 036050  000167  143046                     GOAGIN: JMP     RESTRT             ;DO NEXT PASS
5202 036054                                     EOP1:
     036054  012742  000772                             MOV     #772,-(R2)         ;MOVE TO MAILBOX #  *******  772  *******
     036060  005242                                     INC     -(R2)              ;SET MSGTYP TO FATAL ERROR
     036062  000000                                     HALT                       ;SEQUENCE ERROR
5203
5204
5205 036064  001100                                     START
5206
5207 036066  177777                             PASSPT: -1
5208 036070     015     012     000             MSG:    .ASCII  <15><12><0><0><0><0><0><0>.END OF.
     036073     000     000     000
     036076     000     000     105
     036101     116     104     040
     036104     117     106
5209 036106     040     040     103                     .ASCII  .  CKKAAA0 11/44 CPU/EIS.<0><0><0><377>
     036111     113     113     101
     036114     101     101     060
     036117     040     061     061
     036122     057     064     064
     036125     040     103     120
     036130     125     057     105
     036133     111     123     000
     036136     000     000     377
5210                                            .EVEN
5211 036142  000402                             BRTAB:  BR      .+6
5212 036144  001002                                     BNE     .+6
5213 036146  001402                                     BEQ     .+6
5214 036150  002002                                     BGE     .+6
```

```
036152  002402                              BLT     .+6
036154  003002                              BGT     .+6
036156  003402                              BLE     .+6
036160  100002                              BPL     .+6
036162  100402                              BMI     .+6
036164  101002                              BHI     .+6
036166  101402                              BLOS    .+6
036170  102002                              BVC     .+6
036172  102402                              BVS     .+6
036174  103002                              BCC     .+6                     ;SAME AS BHIS
036176  103402                              BCS     .+6                     ;SAME AS BLO
036200  000000                              $TMP0:  .WORD 0
036202  000000                              $TMP1:  .WORD 0
036204  000000                              $TMP2:  .WORD 0
036206  000000                              $TMP3:  .WORD 0
036210  000000                              $EPIRQ: .WORD 0 ;ERROR PIRQ.
036212  000000                              $LPADR: .WORD 0
036214  000000                              $LPERR: .WORD 0 ;ERROR LOOP
        000002                      .RADIX  2
036216  177777                      YNTAB:  1111111111111111        ;BR
036220  170360                              1111000011110000        ;BNE:   Z=0
036222  007417                              0000111100001111        ;BEQ:   Z=1
036224  146063                              1100110000110011        ;BGE:   N XOR V =0
036226  031714                              0011001111001100        ;BLT:   N XOR V =1
036230  140060                              1100000000110000        ;BGT:   Z+(N XOR V) =0
036232  037717                              0011111111001111        ;BLE:   Z+(N XOR V) =1

036234  177400                              1111111100000000        ;BPL:   N=0
036236  000377                              0000000011111111        ;BMI:   N=1
036240  120240                              1010000010100000        ;BHI:   C+Z=0
036242  057537                              0101111101011111        ;BLOS:  C+Z=1
036244  146314                              1100110011001100        ;BVC:   V=0
036246  031463                              0011001100110011        ;BVS:   V=1
036250  125252                              1010101010101010        ;BCC:   C=0
036252  052525                              0101010101010101        ;BCS:   C=1
        000010                      .RADIX  8

036254  012737  036264  000024      PWRDN:  MOV     #PWRUP,@#24             ;SET UP FOR A POWER UP
036262  000000                              HALT

036264  012737  036254  000024      PWRUP:  MOV     #PWRDN,@#24             ;SET UP FOR A POWER FAIL
036272  012706  001000                      MOV     #STBOT,R6               ;SET UP STACK POINTER
036276  132767  000040  142015              BITB    #40,$ENVM               ;SHOULD PRINT?
036304  001010                              BNE     PWR2                    ;IF NOT: BR
036306  012700  036332                      MOV     #PFMES,R0               ;GET POWER FAIL MESSG.
036312  105737  177564              WATE:   TSTB    @#TPS                   ;TTY READY?
036316  100375                              BPL     WATE                    ;IF NOT: BR
036320  112037  177566                      MOVB    (R0)+,@#TPB             ;PRINT NEXT CHAR.
036324  001372                              BNE     WATE                    ;IF NOT DONE:  BR
036326  000137  001100              PWR2:   JMP     @#START                 ;START PROGRAM AGAIN


036332     012     015     120      PFMES:  .ASCIZ  <12><15>.POWER FAILURE.<12><15>
036335     117     127     105
036340     122     040     106
036343     101     111     114
036346     125     122     105
```

```
     036351     012     015     000
5268                                     .EVEN
5269 036354                              .BLKW   6
5270 036370                              USTBOT:
5271                                     ;************************************************************************
5272                                     ; THE FOLLOWING ARE SPECIAL CPU TRAP
5273                                     ;HANDLERS TO TRAP AND REPORT SPECIAL TRAPS.
5274                                     ;
5275                                     ;************************************************************************
5276
5277 036370                              T04:
     036370  012742  000773                        MOV     #773,-(R2)      ;MOVE TO MAILBOX #  *******  773  *******
     036374  005242                                INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     036376  000000                                HALT                    ;TRAPPED THRU LOC. 4
5278 036400                              T010:
     036400  012742  000774                        MOV     #774,-(R2)      ;MOVE TO MAILBOX #  *******  774  *******
     036404  005242                                INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     036406  000000                                HALT                    ;TRAPPED THRU LOC. 10
5279 036410                              T014:
     036410  012742  000775                        MOV     #775,-(R2)      ;MOVE TO MAILBOX #  *******  775  *******
     036414  005242                                INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     036416  000000                                HALT                    ;TRAPPED THRU LOC. 14
5280 036420                              T030:
     036420  012742  000776                        MOV     #776,-(R2)      ;MOVE TO MAILBOX #  *******  776  *******
     036424  005242                                INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     036426  000000                                HALT                    ;TRAPPED THRU LOC. 30
5281 036430                              T034:
     036430  012742  000777                        MOV     #777,-(R2)      ;MOVE TO MAILBOX #  *******  777  *******
     036434  005242                                INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     036436  000000                                HALT                    ;TRAPPED THRU LOC. 34
5282 036440                              T0114:
     036440  012742  001000                        MOV     #1000,-(R2)     ;MOVE TO MAILBOX #  *******  1000  *******
     036444  005242                                INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     036446  000000                                HALT                    ;TRAPPED THRU LOC. 114
5283 036450                              T0244:
     036450  012742  001001                        MOV     #1001,-(R2)     ;MOVE TO MAILBOX #  *******  1001  *******
     036454  005242                                INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     036456  000000                                HALT                    ;TRAPPED THRU LOC. 244
5284 036460                              T0250:
     036460  012742  001002                        MOV     #1002,-(R2)     ;MOVE TO MAILBOX #  *******  1002  *******
     036464  005242                                INC     -(R2)           ;SET MSGTYP TO FATAL ERROR
     036466  000000                                HALT                    ;TRAPPED THRU LOC. 250
5285 036470  000000                      SPSW:     0
5286 036472  000000                      SUBT:     .WORD   0
5287 036474  036472                      SUBT1:    .WORD   SUBT
5288 036476  000002                      S1:       2
5289 036500  036476                      S2:       S1
5290 036502  177771                      S3:       -7
5291 036504  036502                      S4:       S3
5292
5293 036506  000000                      END:      0
5294         000001                      .END
```

```
A      034466        APASS = 000000        BIT7  = 000200        DEC5   017766        DOP2   010550
ABASE = 000000        APRIOR= 000000        BIT8  = 000400        DEC6   017776        DOP4   014052
ACDW1 = 000000        AROUND  023766        BIT9  = 001000        DEC7   020020        DOP5   014136
ACDW2 = 000000        ASL1    021770        BPTVEC= 000014        DISPRE 000174        DST.PT 035564
ACPUOP= 000000        ASL2    022000        BRCT    024024        DNMB0A 011120        DSWR  = 177570
ACT    036030        ASL3    022016        BRC1    003440        DNMB0B 011130        EIS    025214
ADC1   020454        ASL4    022026        BRC2    003450        DNMB2A 011356        EMTVEC= 000030
ADC2   020464        ASL5    022042        BRC3    003460        DNMB2B 011366        END    036506
ADC3   020504        ASL6    022052        BRH     023776        DNMB2C 011402        ENDABO 035732
ADC4   020514        ASL7    022076        BRN1    003320        DNMB2D 011416        ENDMPC 034554
ADC5   020532        ASR1    022140        BRN2    003330        DNMB2E 011426        ENDPAS 035740
ADDNI = 076150        ASR2    022150        BRN3    003340        DNMB2F 011444        EOP1   036054
ADDW0 = 000000        ASR3    022172        BRTAB   036142        DNMB3A 011526        ER     024010
ADDW1 = 000000        ASR4    022202        BRV1    003370        DNMB3B 011536        ERROR = 104000
ADDW10= 000000        ASR5    022216        BRV2    003400        DNMB3C 011554        ERRVEC= 000004
ADDW11= 000000        ASR6    022226        BRV3    003410        DNMB3D 011572        FILL  = 000377
ADDW12= 000000        ASR7    022256        BRZ1    003250        DNMB3E 011602        GOAGIN 036050
ADDW13= 000000        ASWREG= 000000        BRZ2    003260        DNMB4A 011772        HIADRS= 177742
ADDW14= 000000        ATESTN= 000000        BRZ3    003270        DNMB4B 012002        HITMIS= 177752
ADDW15= 000000        AUNIT = 000000        BR1     001172        DNMB4C 012020        HT    = 000011
ADDW2 = 000000        AUSWR = 000000        BR2     001202        DNMB4D 012030        IJMP   016434
ADDW3 = 000000        AVECT1= 000000        BR3     001214        DNMB4E 012040        IJMP4  016206
ADDW4 = 000000        AVECT2= 000000        BR4     001222        DNMB4F 012054        IJMP5  016376
ADDW5 = 000000        B       034472        BR5     001232        DNM03A 010212        INC1   017600
ADDW6 = 000000        BIC1    017420        BTCON   024314        DNM03B 010222        INC2   017610
ADDW7 = 000000        BIC2    017430        BTERR   024300        DNM03C 010232        INC3   017632
ADDW8 = 000000        BIC3    017446        CACHVE= 000114        DNM1   010064        INC4   017642
ADDW9 = 000000        BIS1    017510        CC      023772        DNM1A  011176        INC5   017656
ADD1   020270        BIS2    017520        CCERR   024534        DNM1B  011206        IOTVEC= 000020
ADD2   020300        BIS3    017540        CC1     024422        DNM2   010100        JMPCK  016436
ADD3   020314        BITCHK  024156        CC2     024436        DNM2A  011254        JMPERR 024350
ADD4   020324        BITCLR  024104        CHECK   034516        DNM2B  011264        JMPSEQ 016456
ADD5   020342        BITCON  024240        CLRCD   024420        DNM2C  011272        JMPT   024340
ADD6   020352        BITSET  024122        CLR1    020056        DNM2D  011302        JMP2   016210
ADD7   020364        BIT0  = 000001        CMP1    020720        DNM3   010116        JMP2A  016226
ADD8   020374        BIT00 = 000001        CMP2    020730        DNM4   010140        JMP3   016136
ADD9   020414        BIT01 = 000002        CMP3    020752        DNM4A  011664        JMP3A  016154
ADEVCT= 000000        BIT02 = 000004        CMP4    020762        DNM4B  011674        JMP3B  016174
ADEVM = 000000        BIT03 = 000010        CMP5    021006        DNM4C  011710        JMP4   016240
AENV  = 000000        BIT04 = 000020        CMP6    021016        DNM5A  012134        JMP4A  016256
AENVM = 000000        BIT05 = 000040        CMP7    021036        DNM5B  012144        JMP4B  016276
AFATAL= 000000        BIT06 = 000100        COM1    021076        DNM5C  012162        JMP5   016344
AMADR1= 000000        BIT07 = 000200        CONT    024026        DNM6A  012242        JMP5A  016364
AMADR2= 000000        BIT08 = 000400        CONTRL= 177746        DNM6B  012252        JMP6   016310
AMADR3= 000000        BIT09 = 001000        CON1    024452        DNM6C  012270        JMP6A  016330
AMADR4= 000000        BIT1  = 000002        CON2    024544        DNM7A  012352        JMP7   016400
AMAMS1= 000000        BIT10 = 002000        CPUERR= 177766        DNM7B  012362        JMP7A  016420
AMAMS2= 000000        BIT11 = 004000        CR    = 000015        DNM7C  012400        JSRCK  017110
AMAMS3= 000000        BIT12 = 010000        CRLF  = 000200        DOPB2A 010624        JSRCKA 017104
AMAMS4= 000000        BIT13 = 020000        D       034476        DOPB2B 010702        JSRCK1 017126
AMSGAD= 000000        BIT14 = 040000        DA      034510        DOP0A  007626        JSRSEQ 017106
AMSGLG= 000000        BIT15 = 100000        DAERR   024230        DOP0B  007652        JSR0   016472
AMSGTY= 000000        BIT2  = 000004        DDISP = 177570        DOP0C  007672        JSR1   016476
AMTYP1= 000000        BIT3  = 000010        DEC1    017716        DOP0D  007722        JSR1A  016520
AMTYP2= 000000        BIT4  = 000020        DEC2    017726        DOP03A 010000        JSR2   016610
AMTYP3= 000000        BIT5  = 000040        DEC3    017742        DOP03B 010010        JSR2A  016640
AMTYP4= 000000        BIT6  = 000100        DEC4    017752        DOP1   010436        JSR2B  016650
```

```
JSR3    016530      MAPH00= 170202      MAPL2 = 170210      MDM7A   013676      NEG50   005766
JSR3A   016570      MAPH01= 170206      MAPL20= 170300      MDM7B   013706      NEG51   005776
JSR3B   016600      MAPH02= 170212      MAPL21= 170304      MDM7C   013724      NEG52   006012
JSR4    016672      MAPH03= 170216      MAPL22= 170310      MDM7D   013744      NEG60   006070
JSR4A   016710      MAPH04= 170222      MAPL23= 170314      MDM7E   013770      NEG61   006100
JSR4B   016720      MAPH05= 170226      MAPL24= 170320      MEMERR= 177744      NEG70   006150
JSR5    016776      MAPH06= 170232      MAPL25= 170324      MFPD0   024642      NEG71   006160
JSR5A   017022      MAPH07= 170236      MAPL26= 170330      MFPD0A  024670      PASSPT  036066
JSR5B   017032      MAPH1 = 170206      MAPL27= 170334      MFPI0   023500      PDRTAB  035672
JSR6    016732      MAPH10= 170242      MAPL3 = 170214      MFPI0A  023526      PFMES   036332
JSR6A   016756      MAPH11= 170246      MAPL30= 170340      MFPT  = 000007      PIRQ  = 177772
JSR6AD  017102      MAPH12= 170252      MAPL31= 170344      MMHDLR  035546      PIRQVE= 000240
JSR6B   016766      MAPH13= 170256      MAPL32= 170350      MMR0  = 177572      PR0   = 000000
JSR7    017044      MAPH14= 170262      MAPL33= 170354      MMR1  = 177574      PR1   = 000040
JSR7A   017062      MAPH15= 170266      MAPL34= 170360      MMR2  = 177576      PR2   = 000100
JSR7B   017072      MAPH16= 170272      MAPL35= 170364      MMR3  = 172516      PR3   = 000140
KDPAR0= 172360      MAPH17= 170276      MAPL36= 170370      MMVEC = 000250      PR4   = 000200
KDPAR1= 172362      MAPH2 = 170212      MAPL37= 170374      MOVCI = 076130      PR5   = 000240
KDPAR2= 172364      MAPH20= 170302      MAPL4 = 170220      MOV1    017240      PR6   = 000300
KDPAR3= 172366      MAPH21= 170306      MAPL5 = 170224      MOV2    017250      PR7   = 000340
KDPAR4= 172370      MAPH22= 170312      MAPL6 = 170230      MOV3    017266      PS    = 177776
KDPAR5= 172372      MAPH23= 170316      MAPL7 = 170234      MRK1    022646      PSW   = 177776
KDPAR6= 172374      MAPH24= 170320      MBDM2A  012614      MRK2    022670      PUSRM = 030000
KDPAR7= 172376      MAPH25= 170326      MBDM2B  012624      MRK3    022700      PWRDN   036254
KDPDR0= 172320      MAPH26= 170332      MBDM2C  012642      MRK4    022722      PWRUP   036264
KDPDR1= 172322      MAPH27= 170336      MBDM2D  012654      MRK5    022734      PWRVEC= 000024
KDPDR2= 172324      MAPH3 = 170216      MBDM2E  012664      MRK6    022750      PWR2    036326
KDPDR3= 172326      MAPH30= 170342      MBDM2F  012702      MSG     036070      REG1    002130
KDPDR4= 172330      MAPH31= 170346      MBDM4A  013236      MTPD0   024750      REG1A   002174
KDPDR5= 172332      MAPH32= 170352      MBDM4B  013254      MTPI0   023612      REG1E   002142
KDPDR6= 172334      MAPH33= 170356      MBDM4C  013266      NBR     024002      REG2    002244
KDPDR7= 172336      MAPH34= 170362      MBDM4D  013276      NEG00   004410      REG2A   002272
KERSTK= 001100      MAPH35= 170366      MBDM4E  013312      NEG01   004420      REG2B   002320
KIPAR0= 172340      MAPH36= 170372      MDM1A   012450      NEG02   004434      REG2C   002352
KIPAR1= 172342      MAPH37= 170376      MDM1B   012460      NEG03   004450      REG3    002400
KIPAR2= 172344      MAPH4 = 170222      MDM2A   012522      NEG04   004460      REG3A   002444
KIPAR3= 172346      MAPH5 = 170226      MDM2B   012532      NEG1    020574      REG3E   002412
KIPAR4= 172350      MAPH6 = 170232      MDM2C   012540      NEG10   004524      REG4    002514
KIPAR5= 172352      MAPH7 = 170236      MDM2D   012550      NEG11   004534      REG4A   002560
KIPAR6= 172354      MAPL0 = 170200      MDM3A   012756      NEG12   004552      REG4E   002526
KIPAR7= 172356      MAPL00= 170200      MDM3B   012766      NEG13   004566      REG5    002630
KIPDR0= 172300      MAPL01= 170204      MDM3C   013004      NEG14   004576      REG5A   002674
KIPDR1= 172302      MAPL02= 170210      MDM3D   013024      NEG2    020604      REG5E   002642
KIPDR2= 172304      MAPL03= 170214      MDM3E   013052      NEG20   004644      REG6    002744
KIPDR3= 172306      MAPL04= 170220      MDM4A   013132      NEG21   004654      REG6A   003010
KIPDR4= 172310      MAPL05= 170224      MDM4B   013142      NEG22   004702      REG6E   002756
KIPDR5= 172312      MAPL06= 170230      MDM4C   013156      NEG3    020626      REN     033434
KIPDR6= 172314      MAPL07= 170234      MDM5A   013362      NEG30   005224      RESR    035622
KIPDR7= 172316      MAPL1 = 170204      MDM5B   013372      NEG31   005234      REST    023030
KMTSTS  035140      MAPL10= 170240      MDM5C   013410      NEG32   005250      RESTRT  001122
KSP   =%000006      MAPL11= 170244      MDM5D   013426      NEG33   005274      RESVEC= 000010
LF    = 000012      MAPL12= 170250      MDM5E   013454      NEG34   005310      ROL1    021460
LKS   = 177546      MAPL13= 170254      MDM6A   013524      NEG4    020636      ROL2    021470
LKVEC = 000100      MAPL14= 170260      MDM6B   013534      NEG40   005666      ROL3    021506
LOADRS= 177740      MAPL15= 170264      MDM6C   013552      NEG41   005676      ROL4    021516
MAINT = 177750      MAPL16= 170270      MDM6D   013572      NEG42   005712      ROL5    021532
MAPH0 = 170202      MAPL17= 170274      MDM6E   013622      NEG5    020656      ROL6    021542
```

```
ROL7   021564     SB2    015544     SIZELO= 177760    SOP1B  003736     SW08  = 000400
ROR1   021626     SB4    015670     SMTSTS 035254     SOP2B  004170     SW09  = 001000
ROR2   021636     SB5    015756     SNMB0A 006354     SOP3A  004754     SW1   = 000002
ROR3   021654     SB5A   015750     SNMB1A 006460     SOP3B  004770     SW10  = 002000
ROR4   021664     SB5X   015766     SNMB1B 006470     SOP4A  005366     SW11  = 004000
ROR5   021702     SB5XAD 015770     SNMB1C 006512     SOP4B  005406     SW12  = 010000
ROR6   021712     SB6    016030     SNMB2A 006634     SOP5A  005450     SW13  = 020000
ROR7   021726     SB6X   016040     SNMB2B 006644     SOP5B  005464     SW14  = 040000
ROTX   015244     SB7    016100     SNMB2C 006660     SOP6A  005530     SW15  = 100000
ROTXAD 015370     SB7X   016110     SNMB2D 006700     SOP6B  005544     SW2   = 000004
ROT0A  014362     SB7XAD 016112     SNMB2E 006710     SOP7A  005612     SW3   = 000010
ROT0B  014372     SCOPE = 000004    SNMB3A 007052     SOP7B  005626     SW4   = 000020
ROT0C  014414     SC3    024514     SNMB3B 007062     SPSW   036470     SW5   = 000040
ROT1A  014462     SC4    024530     SNMB3C 007100     SRC.PT 035560     SW6   = 000100
ROT1B  014472     SDPAR0= 172260    SNMB3D 007110     SR0   = 177572    SW7   = 000200
ROT1C  014516     SDPAR1= 172262    SNM0A  006314     SR1   = 177574    SW8   = 000400
ROT1D  014526     SDPAR2= 172264    SNM1A  006416     SR2   = 177576    SW9   = 001000
ROT1E  014556     SDPAR3= 172266    SNM2A  006554     SR3   = 172516    SXT0   022324
ROT2A  014630     SDPAR4= 172270    SNM2B  006564     SSP   =%000006    SXT1   022334
ROT2B  014640     SDPAR5= 172272    SNM3A  006764     SSP1A  023100     SXT2   022364
ROT2C  014670     SDPAR6= 172274    SNM3B  006774     SSP2   023114     SYSTID= 177764
ROT2D  014700     SDPAR7= 172276    SNM4A  007160     STACK = 001100    S1     036476
ROT2E  014734     SDPDR0= 172220    SNM4B  007170     START  001100     S2     036500
ROT3A  015002     SDPDR1= 172222    SNM5A  007242     STBOT = 001000    S3     036502
ROT3B  015012     SDPDR2= 172224    SNM5B  007252     STKLMT= 177774    S4     036504
ROT3C  015040     SDPDR3= 172226    SNM6A  007326     STK1   035670     TBITVE= 000014
ROT3D  015050     SDPDR4= 172230    SNM6B  007336     SUBT   036472     TBL1   014072
ROT3E  015076     SDPDR5= 172232    SNM7A  007410     SUBT1  036474     TBL2   014156
ROT4   015152     SDPDR6= 172234    SNM7B  007420     SUB0   007554     TEST1  020114
ROT5   015234     SDPDR7= 172236    SOB1   022526     SUB0A  007564     TEST2  020124
ROT6   015304     SETBR  023662     SOB2   022534     SUB1   021140     TEST3  020142
ROT7   015360     SETCC  023702     SOB3   022544     SUB2   021150     TKVEC = 000060
RTS1   017174     SETCD  024512     SOB4   022564     SUB3   021172     T010   036400
R1ERR  002212     SETPDR 035066     SOPA   006232     SUB4   021202     T0114  036440
R10   =%000000    SETUP  023644     SOPB   006252     SUB5   021220     T014   036410
R11   =%000001    SET2BR 023752     SOPB0A 003656     SUB6   021230     T0244  036450
R12   =%000002    SHL    001600     SOPB0B 003666     SUB7   021250     T0250  036460
R13   =%000003    SHLE   001614     SOPB1A 004000     SUPSTK= 000700    T030   036420
R14   =%000004    SHR    001714     SOPB1B 004016     SVR0   035654     T034   036430
R15   =%000005    SHRE   001730     SOPB1C 004062     SVR1   035656     T04    036370
R2ERR  002342     SIPAR0= 172240    SOPB1D 004102     SVR2   035660     TPB   = 177566
R3ERR  002462     SIPAR1= 172242    SOPB2A 004236     SVR3   035662     TPS   = 177564
R4ERR  002576     SIPAR2= 172244    SOPB2B 004256     SVR4   035664     TPVEC = 000064
R5FRR  002712     SIPAR3= 172246    SOPB2C 004326     SVR5   035666     TRAPVE= 000034
R6    =%000006    SIPAR4= 172250    SOPB2D 004352     SWB1   020202     TRTVEC= 000014
R6ERR  003026     SIPAR5= 172252    SOPB3A 005040     SWB2   020212     TST1   001154
R7    =%000007    SIPAR6= 172254    SOPB3B 005064     SWB3   020230     TST10  001554
SA     034502     SIPAR7= 172256    SOPB3C 005132     SWREG  000176     TST100 006522
SAVR   035570     SIPDR0= 172200    SOPB3D 005154     SW0   = 000001    TST101 006602
SBC1   021312     SIPDR1= 172202    SOPX   006216     SW00  = 000001    TST102 006726
SBC2   021322     SIPDR2= 172204    SOPXAD 006262     SW01  = 000002    TST103 007012
SBC3   021340     SIPDR3= 172206    SOPZA  004150     SW02  = 000004    TST104 007126
SBC4   021350     SIPDR4= 172210    SOP0A  003514     SW03  = 000010    TST105 007204
SBC5   021366     SIPDR5= 172212    SOP0B  003534     SW04  = 000020    TST106 007270
SBC6   021376     SIPDR6= 172214    SOP0C  003576     SW05  = 000040    TST107 007352
SBC7   021416     SIPDR7= 172216    SOP0D  003622     SW06  = 000100    TST11  001624
SB0    015422     SIZEHI= 177762    SOP1A  003724     SW07  = 000200    TST110 007434
```

```
TST111   007470     TST174   015562     TST256   025544     TST34    003076     UIPAR1=  177642
TST112   007524     TST175   015624     TST257   025634     TST35    003134     UIPAR2=  177644
TST113   007600     TST176   015704     TST26    002536     TST36    003172     UIPAR3=  177646
TST114   007742     TST177   015772     TST260   025724     TST37    003230     UIPAR4=  177650
TST115   010032     TST2     001244     TST261   026014     TST4     001336     UIPAR5=  177652
TST116   010156     TST20    002152     TST262   026104     TST40    003300     UIPAR6=  177654
TST117   010242     TST200   016042     TST263   026216     TST41    003350     UIPAR7=  177656
TST12    001670     TST201   016114     TST264   026330     TST42    003420     UIPDR0=  177600
TST120   010300     TST202   016460     TST265   026442     TST43    003470     UIPDR1=  177602
TST121   010336     TST203   017136     TST266   026556     TST44    003550     UIPDR2=  177604
TST122   010374     TST204   017212     TST267   026666     TST45    003632     UIPDR3=  177606
TST123   010454     TST205   017276     TST27    002606     TST46    003676     UIPDR4=  177610
TST124   010514     TST206   017366     TST270   026776     TST47    003746     UIPDR5=  177612
TST125   010566     TST207   017456     TST271   027106     TST5     001374     UIPDR6=  177614
TST126   010642     TST21    002222     TST272   027216     TST50    004026     UIPDR7=  177616
TST127   010720     TST210   017550     TST273   027332     TST51    004112     UMTSTS   035404
TST13    001740     TST211   017666     TST274   027444     TST52    004200     USESTK=  000600
TST130   010762     TST212   020030     TST275   027546     TST53    004266     USP     =%000006
TST131   011024     TST213   020066     TST276   027650     TST54    004362     USP1     023054
TST132   011066     TST214   020152     TST277   027752     TST55    004474     USP2     023140
TST133   011144     TST215   020240     TST3     001300     TST56    004614     USP2A    023224
TST134   011222     TST216   020424     TST30    002652     TST57    004720     USP3     023250
TST135   011320     TST217   020542     TST300   030054     TST6     001432     USP4     023274
TST136   011462     TST22    002276     TST301   030156     TST60    005000     USP5     023350
TST137   011622     TST220   020666     TST302   030260     TST61    005074     USP6     023374
TST14    001770     TST221   021046     TST303   030362     TST62    005164     USRM   = 140000
TST140   011730     TST222   021106     TST304   030464     TST63    005334     USTBOT   036370
TST141   012072     TST223   021260     TST305   030576     TST64    005416     WAIT     036006
TST142   012202     TST224   021426     TST306   030710     TST65    005474     WATE     036312
TST143   012310     TST225   021574     TST307   031022     TST66    005554     XBIT1    017330
TST144   012420     TST226   021736     TST31    002722     TST67    005636     XBIT2    017340
TST145   012474     TST227   022106     TST310   031132     TST7     001476     XBIT3    017356
TST146   012566     TST23    002356     TST311   031242     TST70    005726     XOR1     022440
TST147   012722     TST230   022266     TST312   031352     TST71    006030     XOR2     022450
TST15    002022     TST231   022374     TST313   031462     TST72    006114     XOR3     022476
TST150   013100     TST232   022506     TST314   031570     TST73    006204     YBR      024006
TST151   013174     TST233   022574     TST315   031676     TST74    006264     YNTAB    036216
TST152   013330     TST234   022760     TST316   032004     TST75    006324     $APTHD   000330
TST153   013472     TST235   023030     TST317   032112     TST76    006364     $CPUOP   000326
TST154   013642     TST236   023140     TST32    002766     TST77    006426     $DEVCT   000310
TST155   014010     TST237   023420     TST320   032220     UDPAR0=  177660     $ENDAD   036040
TST156   014074     TST24    002422     TST321   032300     UDPAR1=  177662     $ENV     000320
TST157   014160     TST240   023526     TST322   032360     UDPAR2=  177664     $ENVM    000321
TST16    002054     TST241   023634     TST323   032526     UDPAR3=  177666     $EPIRQ   036210
TST160   014244     TST242   024074     TST324   032634     UDPAR4=  177670     $ERN   = 001003
TST161   014330     TST243   024244     TST325   032742     UDPAR5=  177672     $ERROR=  000302
TST162   014424     TST244   024320     TST326   033022     UDPAR6=  177674     $ETABL   000320
TST163   014566     TST245   024360     TST327   033102     UDPAR7=  177676     $ETEND   000330
TST164   014744     TST246   024564     TST33    003036     UDPDR0=  177620     $FATAL   000302
TST165   015106     TST247   024670     TST330   033162     UDPDR1=  177622     $HIBTS   000330
TST166   015162     TST25    002472     TST331   033374     UDPDR2=  177624     $LPADR   036212
TST167   015246     TST250   024772     TST332   033512     UDPDR3=  177626     $LPERR   036214
TST17    002106     TST251   025024     TST333   033576     UDPDR4=  177630     $MAIL    000300
TST170   015314     TST252   025214     TST334   034050     UDPDR5=  177632     $MBADR   000332
TST171   015372     TST253   025310     TST335   034212     UDPDR6=  177634     $MSGAD   000314
TST172   015440     TST254   025374     TST336   034340     UDPDR7=  177636     $MSGLG   000316
TST173   015502     TST255   025460     TST337   034562     UIPAR0=  177640     $MSGTY   000300
```

```
SYMBOL TABLE

$PASS    000306          $SWREG  000322          $TMP2    036204          $TSTNM= 000304          $X     = 034350
$PASTM   000336          $TESTN  000304          $TMP3    036206          $UNIT   000312          $XX    = 177703
$SVPC  = 000200          $TMP0   036200          $TN    = 000337          $UNITM  000340          $XXX   = 000702
$SWR   = 000000          $TMP1   036202          $TSTM    000334          $USWR   000324          .$X    = 001100

. ABS.  036510     000
        000000     001
ERRORS DETECTED:  3

VIRTUAL MEMORY USED:  20354 WORDS  ( 80 PAGES)
DYNAMIC MEMORY:  20434 WORDS  ( 78 PAGES)
ELAPSED TIME:  00:16:02
CKKAAA,CKKAAA/-SP/CRF/NL:TOC=CKKAAA0.MLB/ML,CKKAAA.P11
```